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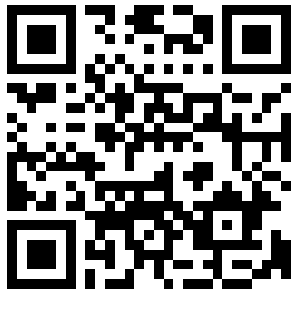

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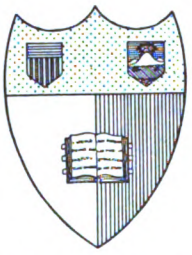

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OUR ILLUSTRATIONS.

New Government Offices, Strand, for the Dominion of New Zealand. Messrs. Crickmay and Sons, Architects.

Church of All Hallows Barking by the Tower, E.C. Restoration and additions. Plans, elevations and sections. The late John L. Pearson, R.A., Architect.

Beech School, Christ Church Square, Lowestoft. Elevation and plan. Messrs. Basil Oliver and Henry J. Chetwood, A.A.R.I.B.A., Architects.

Currente Calamo.

Mr. Basil Peto got little more than was to be expected out of the Government in reply to his question just before the adjournment, on which we commented on this page in our issue of December 20. He asked the Prime Minister whether he was aware that the question of hardship arising out of the state of war in connection with building contracts entered into before the war had been brought to the notice of the late Prime Minister and a draft Bill submitted, and that consideration had been promised; and whether he would undertake that this matter, in view of its importance to one of the largest industries of the country, should not be overlooked, and, considering its daily increasing urgency, would receive consideration at an early date. Sir G. Cave, who replied, said the answer to the first part of the question was in the affirmative, and the matter would receive consideration at an early date. So far we are in much the same predicament as before. Mr. Lloyd George, at any rate, must know, or ought to know better than Mr. Asquith did, the effects of the unfair finance of which he was the author, and that an impression prevails that he hindered the redress which was promised in 1915. We got then "early consideration," the sole fruit of which as yet has been that the builder, while bearing his full share of every burden his fellow-citizens have sustained, has been subjected to an additional heavy tax imposed on nobody else, and has been forbidden even to finish work contracted for before the war broke out.

Five or six of the galleries at the Royal Academy are being prepared for the winter exhibition of graphic art, which will be opened, according to present intention, about the middle of this month. It has been found impracticable to organise during the war the customary winter exhibition of old masters at the Academy, and experiments made in former years of holding a winter exhibition of modern paintings have taught the council that it is bad policy to attempt to hold two exhibitions of contemporary paintings in the same year. So the council have resolved to confine the exhibition for this year to a collection of works tending to encourage the graphic arts. No paintings in oil or water-colour will be admitted, but designs in colour may be offered. The exhibition is in charge of a committee representing the Royal Academy and of the London societies which exist for the furtherance of etching, engraving, and sculpture. Works previously exhibited will be admitted. Members of the various societies represented will be permitted to exhibit as many as eight pictures each. Non-members resident in any part will be invited to offer pictures, but must submit to the judgment of the committee in regard to acceptance.

The fogs of last Tuesday and Wednesday week were as bad as any of the last century. But our forebears then were not impeded by the authorities in their attempts to make the most of their comparatively feeble illuminants. Presumably the Home Office officials were holiday-making last week, or prompt permits would have been published to keep the blinds up later than 5 p.m. Here and there flares were placed, but they were mostly useless. There was one in the front of the Gladstone statue in the Strand, a bowshot from this office, but no one standing on the narrow pavement at the western gates of St. Clement's Church could see it. A timely warning was visible enough at some of the Tube stations, in regard to possible panics likely to arise from overcrowding, or accidents to the lifts. One comparatively narrow spiral staircase is, in our opinion, quite in adequate to meet none too unlikely emergencies. We struggled up one on Wednesday night, and the slight jam-up of passengers consequent on the taking of tickets—at a very unwisely selected spot, by the way—was a little too suggestive of the squeeze that might follow a panic-scared uprush from below, possibly with all lights out, and with too slowly emerging passengers yards higher up blocking speedy egress. An alarmed crowd anywhere on a foggy night is very dangerous companionship; in confined areas, with limited possibilities of individual initiative, and then only at the peril of others, it is a too-possible death-trap.

If Mr. Neville Chamberlain, the Director of National Service—a Lord High Interferer, as some of the journals call him, which are already apparently tiring of the new Ministry of all the Talents—has a free hand, we hope he will insist on the accomplishment of the linking up and generally improving our derelict canals. He is the chairman of a movement about which we have had a good deal to say in past issues, which wants so to restore our canals as to enable them to carry 100-ton barges from the coast to the Midlands. It will take some doing, for the railway companies have done their best to render the canals useless during the past thirty years instead of developing them as feeders, or falling back on them under stress of the results of their own shortcomings. But had it been promptly set about when Mr. Neville Chamberlain first moved in the matter, many millions of tons of heavy goods for which conveyances have been despairingly wanted during the past eighteen months would have been delivered, and the railway stations would not have been blocked for months with stuck-up traffic.

Although the law relating to land and buildings is the oldest part of our legal system, and was shaped for centuries by our courts and judges, it is still full of little surprises, even for the lawyers. One general point to note is that, legally, a furnished house or apartment is dealt with differently from an unfurnished house or room. While in the letting of an empty house or rooms there is generally no warranty by the landlord that it or they are fit for habitation, yet if the same place be let furnished there is such a warranty; and should it not be fit to live in, either by reason of drains or even of bugs, the tenant cannot be held to his bargain. The curious and startling case of "Humphreys v. Miller and Others" shows that in the letting of furnished lodgings there may be yet another surprise. The defendants had brought in a leper to the plaintiff's furnished rooms without disclosing his disease. After this lodger's death there, from leprosy it was discovered, the plaintiff had to destroy some furniture, and suffered other damage, for which the jury had awarded £250; but the judge, on the law, found for the defendants. Now the plaintiff came to the Court of Appeal, arguing that the defendants should have disclosed the fact when taking these lodgings that the lodger was suffering from leprosy, an infectious disease. But the doctor denied this infection, and, on the point of

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law that, in taking furnished rooms, either for or by a lodger, there was no implied warranty of his fitness to occupy, the Court of Appeal confirmed the judge's ruling that there was no ground of action. While medical views vary and leprosy is not legally an infectious or notifiable disease, this ruling holds, and so the plaintiff loses his damages. But the amazing thing is that, in regard to furnished houses or lodgings, the law turns out to be on the side of the tenant or lodger instead of on that of the landlord, as is far more usual in our general legal system.

Mr. Joseph Clarkson, hon. secretary, writes in the course of a letter from Prestwich Park:—The New Cities movement was inaugurated at a meeting I addressed in Birmingham in October last, and a representative committee of 17 members has been formed in that city to assist in carrying it out. I also addressed a meeting in Leeds on the 18th ult., and committees are now being formed there and in Manchester. We have already thirteen freehold estates offered in Southern, Midland, and Eastern Counties, from 2,500 to 14,000 acres, all in cultivation and producing good corn and other crops, and all except one within two to four and a-half miles of a railway station. The object is to secure a suitable estate for a sample city, build business premises, houses for the workers, each house with a good garden, and only put as many people on the estate as it would feed. The workpeople would receive trade union wages, but would also be partners, and after paying all expenses of management the profits would be devoted to suitable provision for old age and any other purpose which would benefit the community. The whole estate and every business, including food growing, would be under one co-operative ownership. There would be no shares; the capital would be raised by donations and loans, and the security would be not only the rates, as in present cities, but the land, buildings, and every business. We are anxious to be ready for building by the time the civilian army is disbanded, and thus provide employment for a considerable number. I shall be pleased to hear from all who will help.

"LEST WE FORGET!"

Another new year finds us much as we were when its immediate predecessor elicited the same dominant wishes. Now, as then, all our customary felicitations give place to the one aspiration. We need hardly repeat it. But, however sincere our prayer that 1917 may see peace restored, it is foolish to dream that it can come by the intervention of neutral nations, or that any such peace could be more than the most delusive truce. Fools and traitors alone will welcome peace on German conditions, or try to persuade us that German treachery will observe any paper guarantees against a repetition of the German tactics of the past fifty years. Till the Hozenhollerns and the Hapsburgs and their contemptible co-bandits are rendered incapable of another such truculent set-back of civilisation, the nations in arms against the disturbers of the world's peace must keep the field, and their children and grandchildren after them, if needs be, till the long night of terror ends, and the awful burden which has prostrated Europe since Prussia, flushed with victory over the smallest of her victims, crushed Denmark, and then, wolf-like, turned to rend its share of the prey from her Austrian fellow-barbarian, is lifted from the shoulders of the nations of the Old World. Our fathers bore the strain unflinchingly against greater odds. Like us, they were precipitated into struggles for which they were equally unready. As with us, the blood of their dearest paid the price of the halting statesmanship and culpable blindness of their rulers. Like them, we will listen to no talk of peace till our slain are avenged, till fullest restitution is exacted for the victims of German greed and savagery, and till the instigators and instruments of the perpetration of the horrors of war on a scale and to a degree surpassing the hideous cruelties of Attila or Alva are punished to the fullest extent of their deserts.

Let us, meanwhile, see to it that, when peace is made, there shall be no shrinking from this resolution. Some already are mouthing reminders that we have "hated" other foes before and made good friends of them when the fight was finished. Of course we did. The wars between France were frequent, but they were fought honourably and chivalrously by each nation, and with the coming of peace all personal hatred ceased. The one foe whom several generations hated was Spain, remembering Philip the Second's treacherous attempt to invade us, and his vile cruelty and that of his agents in the Netherlands, only surpassed by the Kaiser in Belgium. No more than our forebears would have accepted a Spanish peace, or failed to warn their children to guard themselves well against the Power that had sought to plant the Inquisition here, and rob us of the mastery of the seas, must we fail to keep vividly before those that are to come after us the terrible times we are passing through and the culpability and bad faith of those who brought them about. We want to see some general manifestation of readiness to do this. It should dominate all the arts. It should spur alike trader and manufacturer and consumer. It should inspire the poet and the historian, lend colour to the painter, and awaken to the fullest extent the genius of the Mistress Art. Our contemporary *The Engineer* declares, it is true with the somewhat ungracious proviso that "if we could but count with safety upon British artistic sense," no finer subject for the architect could be imagined than the design of a museum to contain the relics and history of the Great War. A building of the largest proportions, and infused with the dignity which is inseparable from war, but at the same time arranged upon a plan that made it suitable for the exhibition of a great variety of objects, would be needed. It should, moreover, embody not only a library for a vast literature, but a picture gallery, and a theatre in which lectures would be delivered, and in which cinematographic films would be shown. It is further suggested that the exhibits would consist not only of actual relics from the battlefield, not only of uniforms and equipment, of transport arrangements, of hospital and veterinary accessories, and of all the material of war, but of examples of the machines and methods employed in the manufacture of munitions. Moreover, raised models of the principal battlefields would be exhibited in special rooms, and examples of trenches and dug-outs would be shown by full-size portions, and by reproductions on a smaller scale. The Navy would require a large portion of the building. Models of all our own ships of the period, models of our Allies' ships, and of the enemy's ships would prove an important feature, but not less important would be actual examples of guns and ammunition. The "Third Arm" would also demand much space, as actual aeroplanes and seaplanes, with models of airships, would have to be exposed. The library would be one of the most important rooms in the building. In it space would be found not only for the contemporary history of the war, but for the literature of all nations that will issue from the press for many long years to come. Moreover, drawings of ships and guns, of shot and shell and fuses, of torpedoes and mines, of aeroplanes, poison gas apparatus and flame projectors, of motor wagons and "tanks," and the thousand and one things that are made for the purpose of killing the enemy, or destroying his possessions, should there be preserved.

Such a building, we quite agree with our contemporary, must be conceived on the grand scale. That France will have her Musée de la Guerre, and Germany her Kriegsmuseum, can hardly be doubted. That their buildings will be finely proportioned and magnificently situated cannot be questioned. The ennobling effect of fine architecture cannot be over-rated, but when the art is exercised upon a subject at once grand and awe-inspiring in itself, as is the abstract conception of war, then the art is indeed raised to a position above all others. Such a Museum of War might, indeed, prove the finest Palace of Peace.

But more is wanted than this. Such a building will, after all, only keep the memories alive we want to see perpetuated, in London, where, we suppose, it would be erected. We want something in every town—if possible in every village—in the Three Kingdoms and throughout the Empire. In the villages, to some extent, the war-shrines will serve, that is, if they are more or less of worthy character architecturally, like that we illustrated last week. In every school we want the record of the struggle and the warning against its too probable renewal. Every parish hall should enshrine a similar reminder. In the towns special buildings should be raised subservient to various useful purposes, but all bearing the stamp of national thanksgiving for victory, and the appeal to the patriotism of our children never again to risk its achievement over so treacherous a foe at disadvantages such as those under which we began the fight, or so blindly to neglect the repeated warnings of true patriots like Lord Roberts. Wherever our readers have direct or indirect influence let them at once set about the education of their fellow-citizens with this object in view. It is none too early to begin the preparation of suitable designs, and we should gladly illustrate any really well-conceived schemes. The requirements for such might well be included in the prize competitions of the architectural and kindred societies at the earliest possible date. Wherever possible the kindred arts should be associated with all undertakings of the kind, and let all strive to make it manifest that the nation may "count with safety upon British artistic sense" to render every sentiment of the great remembrance as vivid as it should prove lasting.

The death is announced on December 27, at Chiswick, of Honoria (Nora), only daughter of Mary and the late John Tavenor Perry.

Bridlington Town Council has decided that in future all garages must be built of incombustible materials, and that plans of garages proposed to be built of other materials will not be passed. The architects in the borough and the Bridlington Master Builders' Association have been informed accordingly.

THE FUNDAMENTAL PRINCIPLES OF REINFORCED CONCRETE DESIGN.*

By Mr. E. McCULLOUGH.

Reinforced concrete is a combination of concrete and metal, preferably steel, with the two materials so disposed as regards position and amounts that each resists the stresses it is best fitted to resist. In piers, posts, and columns the concrete takes compression assisted by the steel, and the vertical steel takes tension if any bending occurs. In beams three stresses act; namely, compression, tension, and shear. The concrete takes all compression and a limited amount of shear. The steel is computed as taking all the direct tension, and assists the concrete to carry shear.

Let us consider a reinforced concrete column 8 x 8 ins. outside dimensions. The steel will be in the form of four bars each ½ in. square. The bars are set in the corners, as shown in Fig. 1, and 1½ in. in from the sides of the column. This is specified for fire protection. The concrete outside of the steel (used for fire protection) assists in carrying the load until the fire comes, but after a severe fire it should not be depended on, so we neglect it entirely in our computations. The actual area of the columns is therefore 5 × 5 = 25 square inches. Four ½ in. square bars have an area of 1 square inch. The ratio of steel to concrete is 1 ÷ 25 = 0.04. The steel ratio multiplied by 100 is the per cent. of steel reinforcement. Our column, therefore, contains 4 per cent. of steel, the maximum for a column of this type. Some building ordinances limit it to 3 per cent., following the lead of Chicago.

When a load is applied to the top of a column and the steel bars get their share they

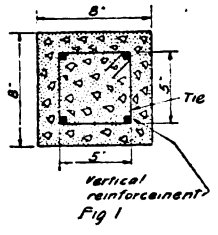

Fig 1

bend because the slenderness ratio (the ratio of length to thickness) is large. It is necessary to put ties around the upright bars, and these ties are spaced at intervals not exceeding twelve times the thickness of the vertical bars. Therefore, in the column under consideration, the ties will be spaced 6 ins. apart because the bars are only ½ in. square. The ties are held in place by No. 18 black stove wire, and the ends are turned in far enough to be gripped by the concrete so they cannot be pulled out when stressed. Ties are usually made of heavy wire or ¼ or ⅜-in. round steel rods.

Having arranged the bars and the ties, how much will our column carry?

Let us assume a 1 : 2 : 4 concrete with an allowable fibre stress in compression of 400 lbs. per square inch. The area of the concrete is 25 square inches less 1 square inch of steel = 24 square inches, which at 400 lbs. gives 25 × 400 = 9,600 lbs. To determine the strength added by the steel we must be governed by the ratio of deformation between the steel and concrete. This, for the concrete we are using, is 15, as determined by experiments.

Assume a piece of steel fastened in a vertical position and a load placed on top. Assume a piece of concrete of the same size similarly placed and loaded with an equal load. Careful measurements will show that both materials shorten under the applied loads, but the decrease in the length of the steel is 1-15 that of the concrete. To produce equal shortening (deformation) under equal loads the cross-sectional area of the concrete must be fifteen times the cross sectional area of the steel. Thus each square inch of steel is equal to 15 square inches of concrete.

Now apply this to the column in question. The area of the concrete is 24 square inches. The area of the steel is 1 square inch, the equivalent of 15 square inches of concrete. Consider the area of concrete to be increased, making it 24 + 15 = 39 square inches. The load-carrying capacity of the column is now 39 × 400 = 15,600 lbs. The average stress is 15,600/25 = 624 lbs. per square inch, an increase of 56 per cent. The unit stress on the steel is 15 × 400 = 6,000 lbs. per square inch.

A safe compressive stress for the steel alone would be 12,000 lbs. per square inch, which shows that it is not economical to use steel in compression in reinforced concrete, except in columns.

We cannot use a steel stress exceeding the concrete stress multiplied by the ratio of deformation or the concrete will be stripped from the steel and the column will fail. The two materials must act together and shorten equally, each carrying a proportion of the load. The ratio of deformation is, therefore, a stress ratio for columns or for members acting wholly in compression.

The following formulas are used for the design of columns in which the unsupported length does not exceed fifteen times the effective diameter or thickness; that is, the thickness of the column after deducing the protective covering of the steel.

Let f = average unit stress per sq. in. of effective area.
f_c = allowable unit stress per sq. in. on plain concrete.
p = ratio of steel to concrete.
A_c = area of concrete in sq. in.
A_s = area of steel in sq. in.
A = total effective area = $A_c + A_s$.
n = ratio of deformation.
P = total load.
then $P = A f = f_c (A_c + nA_s)$.
or $f = f_c [(1 - p) + n p]$.

THE HOOPED COLUMN.

Make a cylinder of thin paper and fill it with sand. The paper is barely strong enough to hold the sand, and if a load is put on top, the paper will burst and the sand will flow. Use a tin cylinder, and the pressure required to burst it will be very great. Instead of sand use cement mortar or concrete and the metal casing can be made very thin, so thin, in fact, that a wire wound spirally around the concrete cylinder will furnish the necessary strength provided the amount of metal in the wire is equal to the amount found to be necessary in the solid thin shell. Poorly made concrete needs more reinforcement than first-class concrete.

The hooped column consists of a concrete core reinforced with vertical steel and having a steel spiral around the core. There should not be less than eight vertical rods not exceeding 6 per cent. of the area. The spiral hooping should not be less than one-half of 1 per cent. and not to exceed 1½ per cent. of the area. More than this amount is wasteful, for it adds little strength. The spiral does not act until the concrete begins to fail, and as it postpones the total failure the effect is the same as increasing the strength of the concrete in compression so we can use 20 to 25 per cent. higher unit stress, depending upon the building ordinance followed. Steel in the form of a spiral, provided it has a pitch not exceeding one-sixth of the diameter, is 2.4 times as effective as the same amount placed vertically. The vertical equivalent of spiral steel is found as follows:—

Let c = circumference of the core in inches.
x = pitch of spiral in inches.
a = cross sectional area of steel used for spiral.
A = area of core in sq. in.

Then the equivalent ratio of spiral per foot of length

$$= 1.1 \frac{c\,a}{A\,x}$$

The strength of the hooped column is

$$P = f_c (A_c + n\,A_s + 2.4\,n\,A_b)$$

in which A_b = area of spiral steel, in terms of vertical steel, or

$$f = P/A = f_c [(1 - p) + n\,p + 2.4\,n\,p'].$$

in which p' = ratio spiral steel expressed as equivalent vertical steel.

In Fig. 2 is shown a beam bending under load. In the middle of the span is shown a vertical line A c an extension of a radial line. On one side of this line is a radial intercept A′b, and on the other side a radial intercept A″d.

Provided the material is homogeneous, that is, uniform in quality and strength, and is not stressed beyond the elastic limit, a vertical section plane before the beam bends is plane after it bends. That is, A c is straight

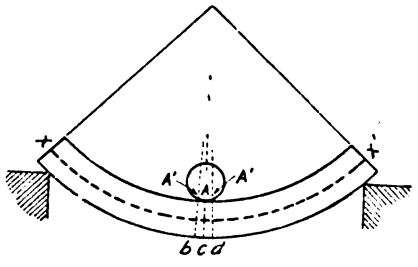

Fig 2

before the load is applied, and the lines A′b and A″d are also straight although the horizontal separation $b\,c$ is greater than A A′, and $c\,d$ is greater than A A″. In Fig. 3 the line A′b is assumed to be moved across A c so the space A A′ = $b'c$. This is equivalent to revolving the line A c until it becomes A′ b'', parallel to A′b.

In Fig. 4 this is again shown to illustrate the two force triangles, the upper one representing compression and the lower one tension. The material being homogeneous the neutral axis x.....x' is midway between the top and bottom edges. The force triangles are therefore equal, the stress being zero at the neutral axis and a maximum at the edges. The maximum unit stress (skin stress some men call it) is designated by the letter f. The average stress is $f/2$.

The area of each force triangle is

$$\frac{f}{2} \times \frac{h}{2} = \frac{f\,h}{4}.$$

We have been considering a thin slice of a beam, and as a beam has breadth we will

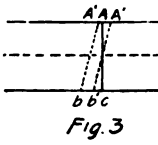

Fig.3

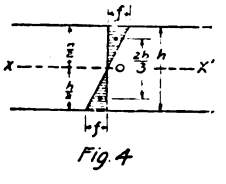

Fig.4

use the letter b (breadth) to designate this. Our force triangles now become wedges, each with a volume = $f\,h\,b/4$.

Forces act through the centre of gravity of bodies and the centre of gravity of a triangle is $h/3$ from the base. The distance between the centre of gravity of the two force triangles is $2\,h/3$, as shown in Fig. 4.

The total compressive force is equal to the total tensile force exerted to resist bending, and each force wedge acts with a moment arm = $2\,h/3$, so we obtain the moment of resistance by multiplication, thus

$$M = \frac{2h}{3} \times \frac{f\,b\,h}{4} = \frac{2\,f\,b\,h^2}{12} = \frac{f\,b\,h^2}{6}$$

for a rectangular beam of homogeneous material; that is, one in which (below the elastic limit) the tensile strength equals the compressive strength.

In Fig. 5 is shown a beam made of two pieces with a hinged joint. In the top of the joint is a block of rubber and at the bottom is a coiled spring. When a load is placed on

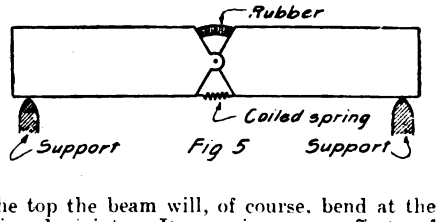

Fig 5

the top the beam will, of course, bend at the hinged joint. It requires no effort of imagination to prove that in the top of the open joint the tendency to close is opposed by the rubber, and in the bottom the ten-

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* From the *Contract Record.*

dency to open is opposed by the spring. Actually the hinge midway is not required. It merely locates definitely the position of the neutral axis, and to consider the hinge as a necessary feature is likely to confuse one as to the action of resisting forces in a beam. The neutral axis is the point where the character of stress changes from tension to compression, or from compression to tension. In a beam of homogeneous material, that is, one in which the tensile and compressive strengths are equal, with symmetrical cross-section, the neutral axis will be midway between the top and bottom surface, or skin. At the skin the stress is a maximum. At the neutral axis it is zero. A diagram illustrating this is triangular and is termed a force triangle.

In Fig 6 (*a*) the compressive triangle has vertical lines and the tensile triangle has horizontal lines. Each triangle overlaps the other and the heavily shaded diamond centre indicates a cancellation of one force by another. The remaining effective stresses are shown in Fig. (*b*). The neutral axis is therefore the point where the tensile and compressive stresses are definitely separated. In a beam with a finite breadth, for we have been considering only a thin vertical slice: the neutral axis becomes the neutral plane. The use of the word neutral implies a point, place or plane where there is a definite neutralisation of opposite forces, or stresses. The force acting along the neutral plane is therefore horizontal shear, for the forces acting on either side are opposite in character and equal in magnitude.

The principle of the lever is evident. The length of the lever arm is the distance between centres of gravity of the opposite forces, and the fulcrum is situated in the neutral plane.

In a reinforced concrete beam steel is placed near the lower edge to take all the tension, for, roughly speaking, concrete is ten times stronger in compression than in tension. In a plain concrete beam the neutral plane will

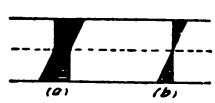

Fig. 6

be very high because the tensile and compressive forces must be equal. The tensile stress will be low and the compressive stress will be high, but the lever arm is a constant. The relative volumes of the two force wedges will be approximately as 10 is to 1.

When steel reinforcement is used the area required is computed on the assumption that it will carry all the tension, and the value of the concrete in tension below the neutral axis is neglected. The tensile stress, therefore, does not vary from zero at the neutral axis to a maximum, but the compressive stress above the neutral axis does so vary.

The ratio of deformation between concrete and steel prevents the consideration of the value of concrete in tension. Experiments have shown that when steel embedded in concrete is stressed in tension to an amount practically equal to the tensile strength of an area of concrete equal to the steel area, multiplied by the ratio of deformation, the concrete cracks. The tensile strength per square inch in the concrete at the level of the steel = f_s/n, in which f_s = unit tensile stress.

These cracks are vertical and fairly uniformly spaced. They probably extend as far into the beam as the neutral axis when the beam is on the point of failure. If the beam is well made and the bond of the concrete to the steel is good the cracks are so small, because numerous, that there is no danger of the entrance of moisture in large enough amounts to cause rusting of the steel. It is therefore possible to use steel with a very high stress, for the ratio of deformation is not a stress ratio as in the case of columns carrying direct compressive stress. In a column a high compressive stress on the concrete may strip it from the steel. In beams a high tensile stress in the concrete merely cracks it and the concrete between the cracks clings to the steel and protects it from corrosion. The vertical tension cracks in beams are shown in Fig. 7.

The ratio of deformation plays an important part in determining the location of the neutral axis in concrete beams. In the Chicago Building Code the following values are used as a result of experiments:—

	Ultimate compressive strength per sq. in.	Ratio of deformation.
1 : 1 : 2	2,900	10
1 : 1½ : 3	2,400	12
1 : 2 : 4	2,000	15
1 : 2½ : 5	1,750	18
1 : 3 : 7	1,500	20

The allowable safe unit stress per square inch is thirty-five hundredths of the ultimate strength in compression.

In reinforced concrete we have two materials with widely differing unit stresses. The

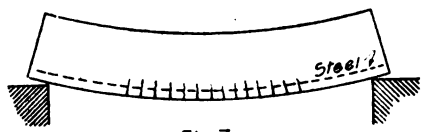

Fig 7

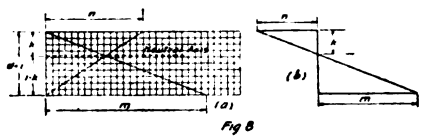

Fig 8

letter f is used to denote the unit stress per square inch, usually termed the "Fibre Stress." The unit steel stress is f_s and the unit concrete stress is f_c. The stress ratio f_s/f_c is denoted by the letter m (meaning "measure"). The ratio of deformation is denoted by the letter n (meaning "number"), for it is an arbitrary number which is approximately correct.

Fig. 8 is a graphical representation of the effect n and m have on the location of the neutral plane in a reinforced concrete beam. On a piece of quadrille ruled paper plot the depth from the top of the beam to the centre of gravity of the steel by setting off ten divisions. Set off on the same scale the ratio of stresses (m) and the ratio of deformation (n) as shown. The depth to the neutral axis, k, may then be scraled. The exact value is

$$k = \frac{n}{n+m}$$

Example. What is the value of k when f_s = 16,000 lbs. per square inch and f_c = 650 lbs. per square inch.

$$n = 15$$

$$m = \frac{16000}{650} = 24.62$$

$$k = \frac{n}{n+m} = \frac{15}{15+24.62} = 0.378\,d$$

Fig. 9 shows the force triangle of the concrete in compression and the steel in tension. To find the ratio of steel, proceed as follows:—

The total amount of compressive force is found by obtaining the area of the force triangle. The height is $k\,d$, and the average stress is $f_c/2$. The compression = $k\,d\,f_c/2$. We use $k\,d$ for the depth, d has a definite

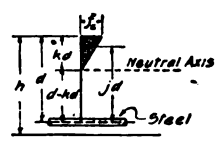

Fig. 9

value, and k is a percentage of d. The moment arm, the lever, has a length = $d - k\,d/3$ or $j\,d$ ($j = 1 - k/3$). The total compressive force in a thin slice, $C = f_c/2 \times k\,d\,j\,d = f_c/2 \times k\,j\,d^2$.

The tensile force, $T = f_s\,A\,j\,d$, in which A = area of steel in square inches. The steel ratio = $A/b\,d = p$, so it is necessary to introduce the breadth, b, into the expression.

We have now $C = f_c/2 \times k\,j\,b\,d^2$ and $T = f_s\,p\,j\,b\,d^2$ then $f_c\,k/2 = f_s\,p$, provided C = T, which is the case for a beam with "balanced" reinforcement.

Assigning values, $650/2 \times 0.378 = 16{,}000\,p$, and

$$p = \frac{325 \times .378}{16{,}000} = 0.00767$$

$p \times 100$ = per cent. of steel = 0.767 (0.77%).

By formula, $p = k/2\,m$.

Assume a beam 6 ins. wide, with depth to the centre of the steel = 9 ins. What is the resisting moment?

$$C = 325 \times 0.378 \times 0.874 \times 6 \times 9^2 = 52{,}242 \text{ inch-pounds.}$$

What area of steel will be required?

$A = b\,d\,p = 6 \times 9 \times 0.0077 = 0.42$ square inches.

Check the steel:

$$T = f_s\,A\,j\,d = 16{,}000 \times 0.42 \times 0.874 \times 9 = 52{,}859 \text{ inch-pounds.}$$

The greater resisting moment in tension is due to having used 0.42 square inch of steel, the exact area being 0.4158 square inch. The area of steel used is governed by the commercial sizes of bars and rods, or the expanded metal or wire fabric used. The actual steel area used will usually be greater than the theoretical area necessary.

Every reinforced concrete beam has two moments of resistance—one determined by the concrete, the other by the steel. The lesser of the two is the resisting moment which determines the actual strength. In designing slabs, a width of 1 ft. is taken, for a slab is merely a wide and shallow beam assumed to be made up of a number of beams each 12 ins. wide.

R is a moment factor. For the concrete $R = f_c\,k\,j/2$. for the steel $R = f_s\,p\,j$. Then the bending moment $M = R\,b\,d^2$; $b = M/R\,d^2$; $d = \sqrt{M/R\,b}$.

To design a beam, select stresses for the steel and concrete and find R. The value of M is the bending moment, which is equal to, or is less than, the resisting moment. Assume a breadth and solve for the depth, or assume a depth and solve for the breadth. T beams are beams in which the floor slab is considered to be a part of the beam and carries the compression. The breadth, b, is the width in the floor slab, and the stem below the slab must be wide enough to contain the reinforcement. The width necessary must include space between the bars, and on each side to furnish bond and shearing strength.

Below the steel there must be a covering of concrete not less than the thickness of the steel, with a minimum thickness of ½ in., this

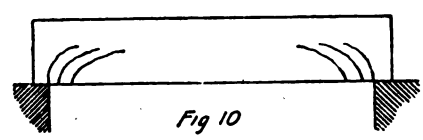
Fig 10

being for bond and fire protection. In all building ordinances minimum coverings of concrete are specified, as, for example, ½ in. for slabs and 1½ in. for beams, girders, and columns.

SHEAR.

Fig. 10 shows a beam with typical shear cracks. A beam may fail by crushing of the concrete in the top, by the stretching or slipping of the steel, or by shear, which is manifested by the appearance of shearing cracks. These cracks are an indication of tension in the concrete, and stirrups are used to prevent shearing (diagonal tension) failures.

Fig. 11 (*a*) shows a uniformly loaded beam resting freely on two supports. At (*b*) is shown the shear diagram. The vertical shear at either end is equal to one-half the load, and is zero at the point of maximum bending moment. The vertical depth, measured in pounds, of the shear diagram at any point is a sum-curve of the loading to that point.

The bending moment at any point is the area of the shear diagram between that point and the support. The vertical dimension is in pounds. The horizontal dimension is in feet when the result is foot-pounds, and in inches when the result is inch-pounds. The bending moment at any section, such as $y \ldots y$, is the sum-curve of the shear at that section.

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The shear being tension increases from the top and bottom skin to a maximum at the neutral axis, where the bending stress changes from tension to compression, and from compression to tension. In a beam of homogeneous material with a uniform cross-section the shear is the same above and below the neutral plane at equal distances from this plane. This distribution of horizontal shear is found in a reinforced concrete beam above the neutral plane. Below the neutral plane the shear is constant, for all the tension is carried by the steel. The unit value of the

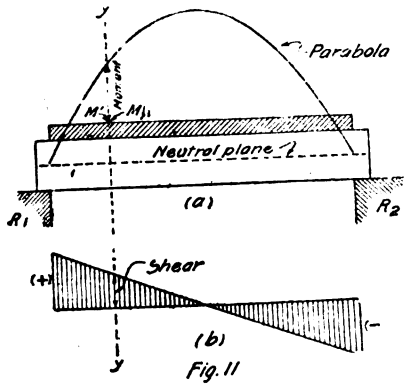

Fig. 11

shear at all depths from the neutral axis to the centre of gravity of the steel is determined by the expression $v = V/j\ b\ d$, in which d = depth from top of beam to centre of gravity of the steel.

In Fig. 12 is given an illustration of horizontal shear. Several planks, laid loosely on end supports, bend under load, and the slipping of one plank past the adjoining plank is a horizontal movement. This is shown in Fig. 12, *a*. Spike, or bolt, the planks together, as shown in Fig. 12, *b*, and the slipping cannot occur. The spikes or bolts represent with fair accuracy the stirrups used in reinforced concrete beams. The shear being a maximum at the ends where the bending moment is a minimum, the fastenings are closer together than nearer the middle of the span, where the shear is a minimum, and the bending moment is a maximum.

By reference to Fig. 11*b* it is seen that vertical shear exists at all points on a beam. We have seen that horizontal shear also exists at all points on a beam. Along the neutral

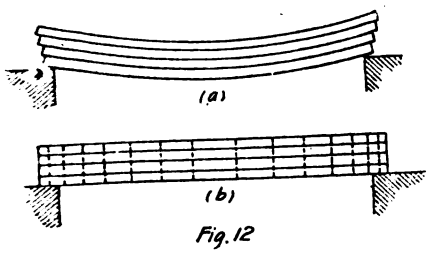

Fig. 12

plane it is equal to the maximum end vertical shear. Very thin horizontal slices, like the planks in Fig. 12, are assumed for the purposes of computation.

The resultant, according to the parallelogram of forces, is a diagonal tension, which causes the cracks shown in Fig. 10.

In designing reinforced slabs, beams, and girders, the resisting moment must be equal to or greater than the bending moment. When this is fixed the beam must be tested for shearing strength, and if it is found to be deficient in this particular, steel in the form of stirrups must be provided or the size of the beam be increased. The unit-shearing stress, v, should not exceed 40 lbs. per square inch for the concrete alone, nor exceed a total of 120 lbs. per square inch when stirrups are used.

BOND.

Experiments have shown that 70 lbs. per square inch is a safe allowance for bond in order that the steel and concrete may act together. The coefficient of expansion of the two materials is practically the same, so we need not fear a separation under extreme variations in temperature.

Assuming the two materials to act together and the safe bond stress is 70 lbs. per square inch, what length of embedment is necessary for a bar 1 in. square, stressed 16,000 lbs. per square inch?

The 1-in. square bar has 4 square inches of surface for each inch of length.

$16{,}000/\ (4 \times 70) = 57.142$ ins. embedment required.

Four ¼-in. square bars have the same area as one 1-in. square bar, but the surface $= 4\ (4 \times \frac{1}{4}) = 8$ square inches, and the length of embedment $= 16{,}000/\ (8 \times 70) = 28.57$ ins.

When a large bar having sufficient area to carry the tension is found to be deficient in bonding area, smaller bars may be used. The stress is the maximum tensile stress in the reinforcement at the point of maximum bending moment, and the reinforcement each side of this point must be long enough for bond.

BENDING UP STEEL.

The bending moment decreases toward the supports, and when a number of bars are used they may gradually be decreased in number, always allowing not less than two to go the full length in the bottom. The other bars are turned up a short distance past the point where they are no longer needed for direct tension, being carried to within an inch of the top of the beam on an angle of 45° or less, and thence horizontally to the supports. Half the steel area may thus be bent up at 0.23 of the span from the support, one-half of the remainder at 0.15 of the span, and one-half the remainder at 0.10 of the span. These rules are closely approximate, and apply only to uniformly loaded beams. Exact rules are given in text-books. Bent-up steel assists in reinforcing the web or body of the beam, and thus strengthens the beam against failure by shear.

STIRRUPS.

Stirrups should be fastened to the tension steel, not merely looped around it. They should extend far enough above the neutral axis to develop bond. The stress in the stirrups is tension, and it is equal to the tension in the concrete multiplied by the ratio of deformation at the instant the concrete cracks, when the whole stress is immediately taken by the steel. The stress used for stirrups should not exceed 75 per cent. of the stress in the tension reinforcement.

The stirrups should be equal in area, and the intervals should increase by increments of 50 per cent. or logarithmically, the greatest interval being equal to d. The area of steel in the bent-up bars should be neglected when it is more than 0.15 L from the supports, for the maximum shear is at the edge of the support at either end. When four stirrups are used at each end, the first will be $\frac{1}{4}\ d$ from the support, the second $\frac{1}{2}\ d$ from the first, the third $\frac{3}{4}\ d$ from the second, and the fourth d from the third.

REINFORCING A CIRCULAR TANK.

In a round tank the only stress is tension, being equal to $w\ d/2$, in which w = weight (pressure), d = diameter.

The tension is figured for strips 1 ft. wide, the weight used being the weight of the liquid at the depth of the strip. The weight of 1 cubic foot of water being 62.5 lbs., w at the depth of 10 ft. is 625 lbs. At 15 ft. the weight is 937.5 lbs.

The stress to be used in the steel cannot exceed f_s/n, or large cracks will open. The concrete shell should be designed to carry all the stress with an assumed safe unit tensile stress. Steel should be used to carry all the tensile stress. This combination fixes the unit stress in the steel as equal to $n\ f_c$ until something causes the tank wall to crack, after which all the tension is carried by the steel with the assumed fibre stress, f_s.

Owing to the difficulties encountered in construction, no tank wall should have a thickness of less than six inches, regardless of the theoretical thickness found by computation.

Example: Give the proper thickness of wall and amount of steel required for a circular tank 20 feet in diameter at a depth of 14 feet, using a 1 : 2 : 3 concrete.

$$T = \frac{w\ d}{2} = \frac{14 \times 62.5 \times 20}{2} = 8{,}750 \text{ lbs.}$$

Use a tensile stress of 12,000 lbs. per square inch in the steel in order to care for possible mistakes in connecting ends of bars. Clamps should not be used. The best method is to have the ends of the bars overlap a length of not less than 40 times the thickness. The overlapping ends should not be in contact, but should be separated to leave a space of about twice the thickness of the bars so the concrete may surround the steel.

$A_s = 8750/12{,}000 = 0.729$ square inches (area of steel).

Use three ½-inch square bars, giving an area of 0.75 sq. in.

A safe tensile stress for well made 1 : 2 : 3 concrete is 175 lbs. per square inch. Area of concrete = 8,750/175 = 50 square inches. The theoretical thickness of the wall is 50/12 = 4.166 in., for the strip is 12 inches wide. The thickness, for reason given, should be not less than 6 inches, so the actual area will be 72 square inches.

The area of the concrete is 72 square inches minus area of steel = 72 − 0.75 = 71.25 sq. in.

The ratio of deformation for 1 : 2 : 3 concrete is 12, so the steel is equivalent to a concrete area of 12 × 0.75 = 9 sq. in.

Adding: 71.25 + 9 = 80.25 sq. in.

The average stress is 8,750 ÷ 72 = 121.53 lbs. per sq. in., and the stress on the concrete is 8,750 ÷ 80.25 = 109.03 lb. per sq. in.

The stress in the steel, when both materials are carrying tension is 12 × 109.03 = 1,308.36 lb. per sq. in.

If, for any reason, the concrete cracks the steel will carry all the tension with a stress of 12,000 lbs. per square inch. Cracks may occur where an occasional poorly mixed batch of concrete was deposited; where construction joints are defective; where forms were removed too roughly; through ice pressure; by reason of excessive temperature changes; frequent and sudden changes in pressure due to quick filling or emptying of water; through defective foundations. When the steel stress is not permitted to exceed 12,000 lbs. per square inch the only effect of cracking will be to throw the entire tension on the steel and the cracks will not be large enough to cause corrosion or leakage.

Owing to the dustmen having enlisted or gone on war work, the Willesden Council dust removal contractor is advertising for women to do the work.

The death is announced, on Wednesday, December 27, after a short illness, of Mr. John Collins Francis, the eldest son of the late John Francis, of the *Athenæum*, aged seventy-eight. The interment took place at Norwood Cemetery yesterday.

Mr. John Chisholm Towner, one of the oldest auctioneers and estate agents in Sussex, has resigned his position as an Alderman of the Eastbourne Town Council. For more than half a century he has held a prominent position in the public life of the borough.

Mr. Kingsley Wood, of the London County Council, speaking at the Great Arthur Street Institute, Moreland Street, last Sunday, said that a case had recently been brought to his notice of the wife of a munition worker who had six children, and fifty-two landlords in London had refused to let her a house, a flat, or rooms on account of her family.

A petition has been presented to the Chancellor of the Diocese of London by the rector, the Rev. P. Clementi-Smith, and the churchwardens of the united parishes of St. Andrew by the Wardrobe and St. Ann, Blackfriars, for a faculty to authorise the erection of a war shrine in the churchyard of St. Andrew by the Wardrobe, the church of the united parishes, in Queen Victoria Street. The design for the shrine has been submitted to the Chancellor for his approval.

At Chester last Thursday William Henry Lancaster, forty-three, until lately land agent to the Cheshire County Council small holdings, was charged with making a false entry in a cash-book in December, 1915. He pleaded not guilty. The County Accountant (Mr. V. Williams) said that so far as it was possible to ascertain, up to the present there was a total deficiency of nearly £1,800. The investigations were not yet completed. The accused was remanded for eight days. Bail was allowed, Lancaster himself in £2,000 and two sureties of £1,000 each.

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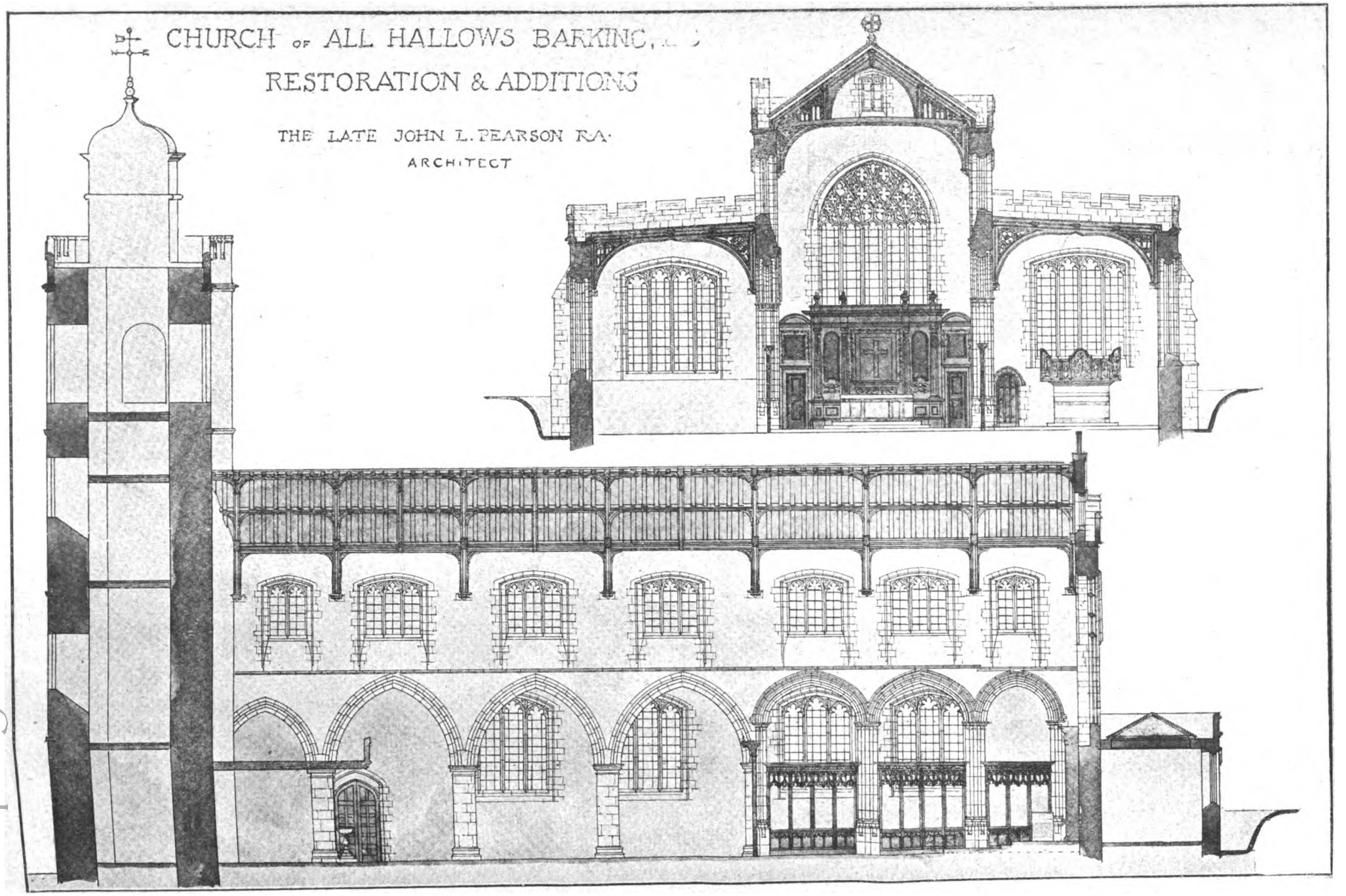

CHURCH OF ALL HALLOWS BARKING BY THE TOWER, E.C.: RESTORATIONS AND ADDITIONS.
The Late JOHN L. PEARSON, R.A., Architect.

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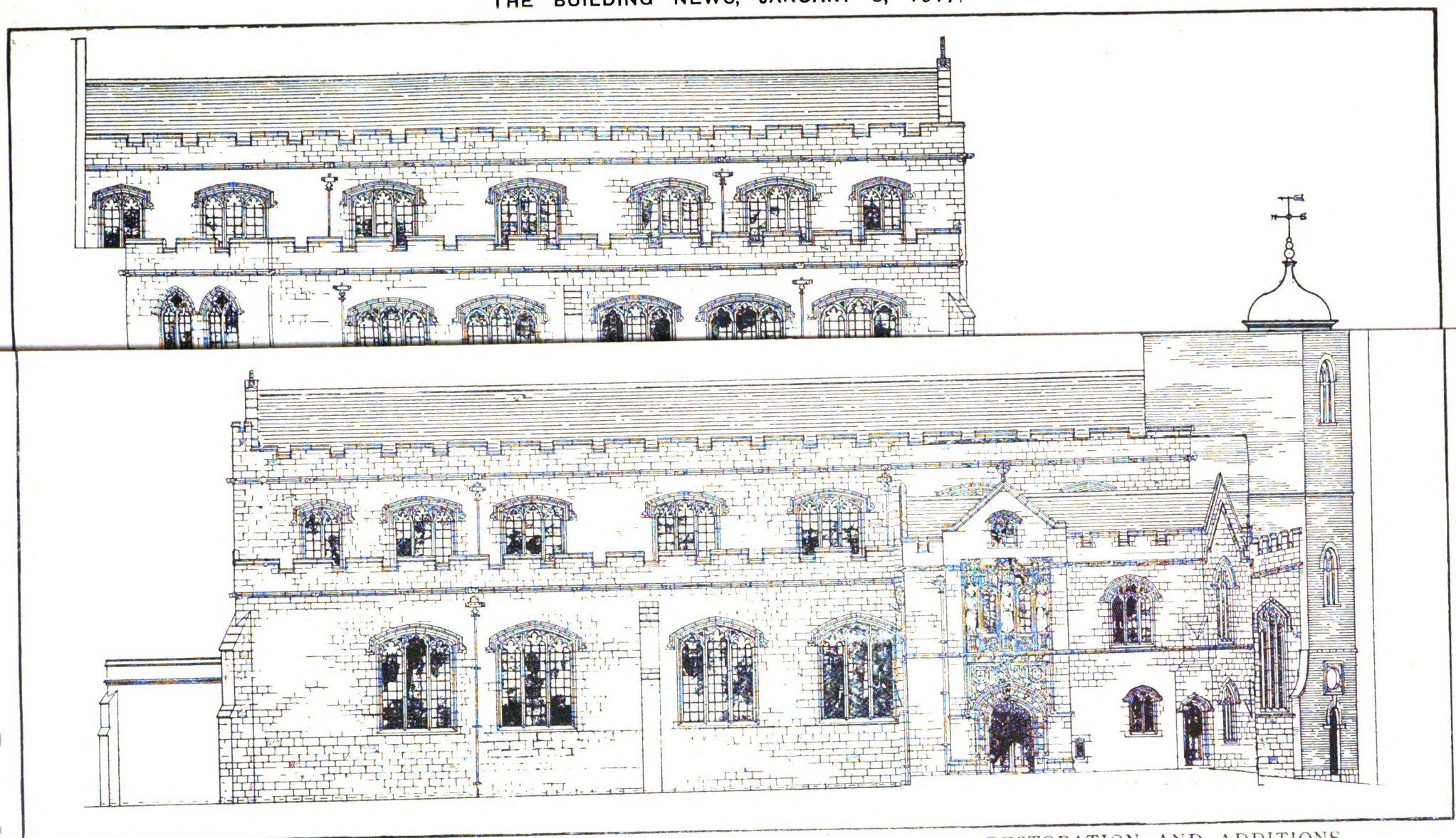

CHURCH OF ALL HALLOWS BARKING BY THE TOWER, LONDON, E.C.: RESTORATION AND ADDITIONS
The Late JOHN L. PEARSON, R.A., Architect.

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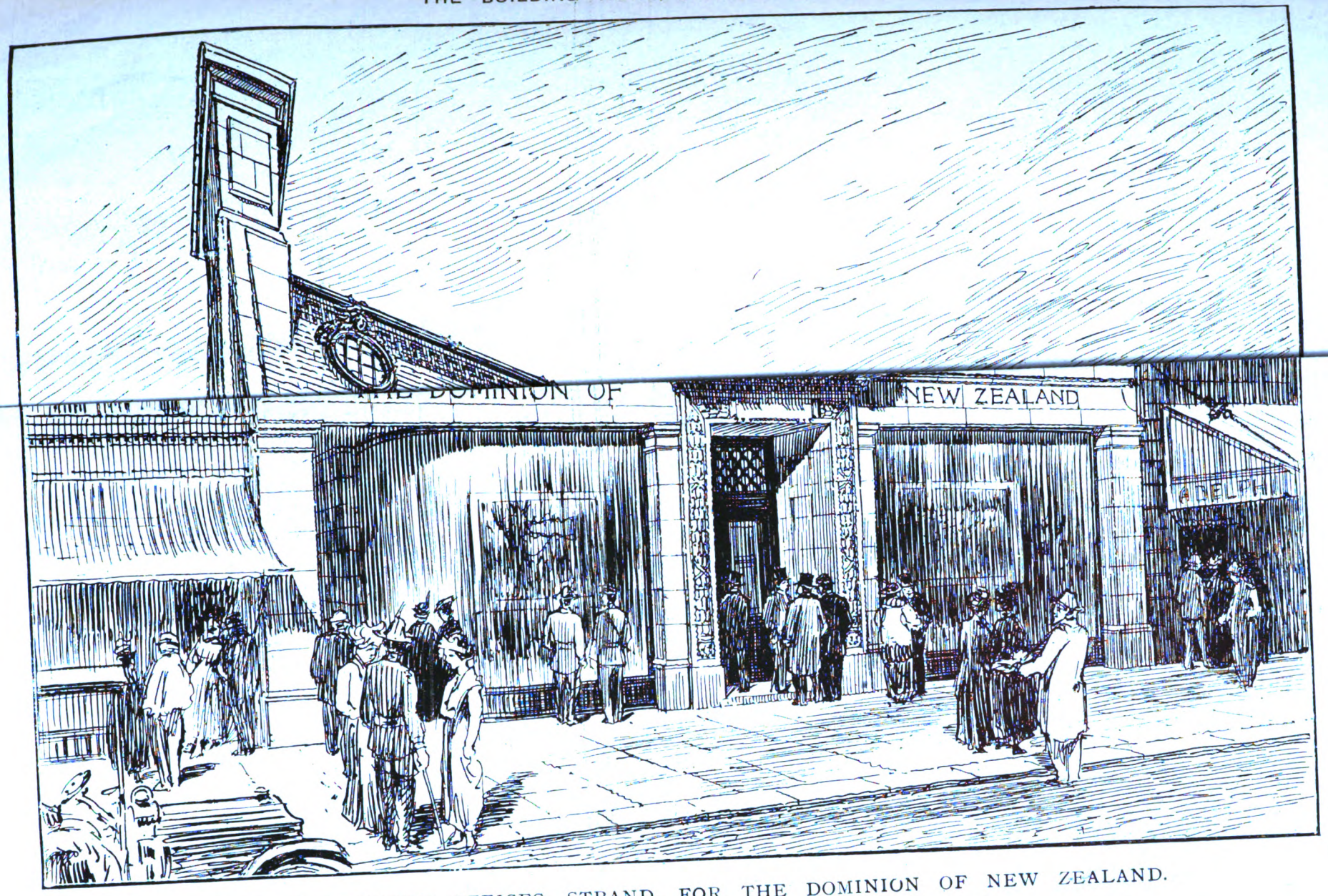

NEW GOVERNMENT OFFICES, STRAND, FOR THE DOMINION OF NEW ZEALAND.

Messrs. CRICKMAY AND SONS, Architects.

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BEACH SCHOOL, CHRIST CHURCH SQUARE, LOWESTOFT.
Messrs. Basil Oliver and Henry J. Chetwood, AA.R.I.B.A., Joint Architects.

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Our Illustrations.

NEW GOVERNMENT OFFICES FOR THE DOMINION OF NEW ZEALAND, STRAND, W.C.

This perspective drawing, to which we have devoted a double-page plate to-day, was shown at the Royal Academy Exhibition the 1916 season. The building was opened a few months ago. On December 15 last year we gave a detail drawing of the façade and the two principal plans of the building. The architects are Messrs. Crickmay and Sons, of Westminster, and the builders were Messrs. John Greenwood, Limited. The clerk of the works was Mr. B. T. Price. The asphalte was provided by Claridge Asphalte Co., Limited. The lift was erected by Messrs. Waygood-Otis, Limited. The first-floor rooms are used by the High Commissioner, and the secretary's department is on the next floor. The façade is in Portland stone, and from roof is covered with green Westmorland slates.

CHURCH OF ALL HALLOWS BARKING BY THE TOWER, LONDON, E.C.

The accompanying scale illustrations were reproduced from the set of contract drawings prepared by the late John L. Pearson, R.A., when this famous church was restored, and also extended by the erection of the great porch with school over. Messrs. Cornish and Geymer, of North Walsham, Norfolk, were the builders. The sculpture and carvings were carried out by Mr. Nathaniel Hitch. We are indebted to Mr. Frank L. Pearson, F.R.I.B.A., for the loan of these elevations, sections and plans, which we borrowed as supplementary illustrations to the double-page view of the interior from the Royal Academy Exhibition, lent us by Mr. John Eyre and given in our issue of September 27 last, when two photographs of the church were contributed by the Rev. Dr. C. R. Davey Biggs, of Oxford. A descriptive article appeared in the same number, furnishing many particulars about the building and its history. Some of the parts of Mr. Pearson's scheme were left to stand over, and, for one thing, Grinling Gibbons' font has not been shifted to the west end as shown by the plan. It remains in the south aisle in a line with the pulpit, which position is, of course, unusual. The Cromwellian tower of brickwork is left as it was without the additions of the new parapet and terminal balls at the four corners as shown by the elevations. In our judgment, it is preferable to let this Protectorate belfry stand untouched as a representative of its date and style, for very few instances of church work of this period remain as built. The par-closes proposed by Mr. Pearson to screen the choir and sanctuary from the aisles or side chapels will be added some day after the war is over, when, no doubt, the south chapel will be furnished as drawn on the plan and sections. Our previous description is elucidated by the accompanying details, and the deviation on plan from the otherwise rectilinear lay-out of the church will be seen to occur at the western end of the nave next Seething Lane, where the tower stands wedged in next the shallow warehouse facing Great Tower Street. The smaller plan, attached to the bigger one, gives an idea of the Sunday schoolroom above the groined new porch facing Byward Street. This extension occupies the site of what was called the "glebe-land cottage," pulled down to make room for the entrance and to open up Barking Alley. Little remains to say about the history of the church, because we recapitulated most of the leading facts known about it. The Royal Institute of British Architects was presented lately with a collection of autograph and other original drawings by William Burges, A.R.A., and there is a sheet, among the series given by Mrs. J. Wentworth Watson, of the fine Evyngar memorial brass worked out from a rubbing from the slab itself, which we somewhat fully described in our article of September 27. It is situate in the central aisle of All Hallows, Barking. Burges was, of course, pre-eminently an authority on all such matters, and by making this study he marked his keen appreciation of so exceptional an example in this country of old Flemish metal chasing fixed in a parish church.

BEACH SCHOOL, CHRIST CHURCH SQUARE, LOWESTOFT.

This school is illustrated from the drawing exhibited at the last Royal Academy by the architects, Messrs. Basil Oliver and Henry J. Chetwood, A.A.R.I.B.A., of Southampton Street, Bloomsbury, W.C. The plan is given in the corner of the water colour. The builder was Mr. Charles Roper, of Waterworks Street, Ipswich. The elevation shown faces east, the girls' and infants' entrance being to the right hand of this front, which overlooks the girls' and infants' playground. The boys' door is on the west front of the building, where the assembly halls occur on the plan of both floors.

THE SOCIETY OF ARCHITECTS.

The report of the Council of the Society of Architects for the year ended October 31, 1916, to be presented to the annual general meeting on Thursday, January 11, states that the society has held forty-five meetings during the year, of which thirty-six were council and committee meetings and the remainder ordinary and extraordinary meetings. The only paper read before the society during the year was the one by Mr. H. Freyberg, F.S.I., on the "Conversion of Mansions and Maisonnettes."

The articles of association have been revised and amended in certain directions. The chief alterations are some new disciplinary clauses and the reconstitution of the council, giving London and country members definite proportionate representation thereon with more continuity of service, and ensuring an annual influx of new councillors.

Thirteen candidates have been admitted to membership, one to graduateship, and two to the register of students. After allowing for deaths, resignations, lapses, removals and transfers to other classes, the total membership on October 31 was 1,171, made up as follows. Last year's figures are given for the purpose of comparison :—

	1916.	1915.
Members	963	1,003
Hon. Members	27	30
Retired Members	31	25
Graduates	9	178
Students	141	148

Upwards of 25 per cent. of the members (in every class) are serving with H.M. Forces, and many "ineligible" members are engaged in other forms of national service.

The council regret that the society has sustained the loss by death of the following :—Members : J. D. Anderson, Durban; A. E. Anthony, Brighton; C. R. H. Ashby, Farnham; Harry Cooper, London; B. J. Emery,* Birmingham; T. C. Hope, Ilkley; T. M. Houghton, London; David MacBean, Glasgow; Chas. F. Mitchell, London; Kershaw Peters,* Grimsby; W. Dymock Pratt, Nottingham; H. E. Rider, London; A. W. Saville, London; Alfred E. Smith, London; Benjamin Turner, Barnsley; G. W. Watson, Melbourne; Arthur Winch,* Leeds. Hon. members : Harry Hems, Exeter; Sir James D. Linton, London. Students : A. C. Baxter,* Leeds; David Evans,* Welshpool; W. J. Hill,* Redruth.

Financial Position.—In the last annual report it was intimated that in addition to the economies effected during that year, certain others were in hand which would be reflected in the accounts for this year. That forecast has been justified. The principal economies are in general household expenses, postage, printing and stationery, and legal charges, in which there is a total reduction on last year of £209. A saving of £130 has been effected on the *Journal* in printing and postages. The examination expenses are also considerably less. The maintenance charges and salary list remain practically normal, and the only increase on the debit side is in depreciation of investments. The net result for the year is a total reduction in expenditure of £450 and a surplus of £579, as against one of £326 last year. On the credit side there is a decrease of £90 in subscriptions and of £90 in the revenue from the *Journal* and *Year Book*. The latter is more than compensated for by the reduction in printing, and these publications have only cost the society £95, or £38 less than last year. There is a drop in examination fees, as was anticipated. A new source of revenue has been the letting of the society's rooms for arbitration meetings. Last year's bank overdraft of £300 has been converted into a cash balance of £100, and the total surplus of assets over liabilities has been increased from £3,291 to £3,309. The outstanding subscriptions are considerably in excess of last year, owing to concessions made to members, particularly to those serving with H.M. Forces, but as the whole of the surplus has been carried to reserve there is ample margin for these and other contingencies. The society's securities are free from any bank or other charges. This means that in seven years the society has paid out of revenue the whole of the expenses incurred in adapting and equipping its permanent premises, something like £3,300 without encroaching permanently on its securities. The net financial result of the year is that by carefully nursing the society's resources and a cutting down of expenses the society has been able to provide against an inevitable heavy loss in revenue due to unpaid subscriptions and other causes, and to deal liberally with those of its members temporarily unable to keep up their subscriptions, to increase its surplus, write off its doubtful debts, and make a good reserve against possibly worse conditions during the coming year.

The graduateship and membership examinations have been held in London, Liverpool, Cardiff, York, Dublin, and Toronto. Nine candidates were admitted to the examinations, of whom only three satisfied the examiners. Owing to the temporary decrease in the number of candidates, the council decided for the present to hold the examinationsc annually instead of bi-annually as heretofore.

The use of the society's premises and the services of the society's staff have been again placed by the council at the disposal of the Beaux Arts Committee and of the Professional Employment Committee of the Architects' War Committee. The society has no financial responsibility in connection with either of these bodies. The Beaux Arts Committee is continuing its important educational work at the Atelier during the war under somewhat modified conditions, and the Professional Employment Committee has been the means of giving a helping hand to a number of architects at the psychological moment when paid employment, and not charity, was needed to tide them over a difficult interval.

The council has long felt that, if possible, opportunity ought to be made during the war for a conference with the R.I.B.A. on some points at issue hitherto between the parties, so that the friendly relations existing at present between them might become permanent and the need for raising similar contentious questions after the war become non-existent. A letter was therefore addressed to the Council of the R.I.B.A. suggesting a conference of representatives on registration and other matters. In doing so the society pointed out that both bodies were to a large extent agreed upon the principle of registration, but divided upon the method of carrying it into effect, the result being that when either party made a move

* Killed in action.

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a deadlock ensued. The society also suggested that even on less contentious matters there was unnecessary overlapping and duplication of effort, and that there was room for co-operative action on economic lines in the direction of the standardisation of forms of contract and other professional documents and in other ways. The reply of the Council of the R.I.B.A. was to the effect that as the subjects suggested for consideration at the proposed conference were of a controversial character, the council were precluded from discussing them during the war by pledges given to their members. The council of the society received this information with regret. The council of the society will now have to consider whether under these circumstances it shall proceed independently in formulating its registration programme, issuing its form of contract, and developing its other reform proposals in readiness for propaganda work after the war.

In response to an invitation from the Research Committee of the Board of Education to the society to co-operate with them by indicating specific problems which in the opinion of the society require investigation in the industries with which the society is most intimately concerned, the council made a number of suggestions. On these being submitted to the Research Committee, the society was invited to elaborate its proposal for an investigation into the question of finding reliable but cheaper materials for use in building work. It was proposed by the Research Committee that the society should discuss the matter with one of their members, and a sub-committee was formed and a number of meetings held, at which the Research Committee's representative was present. The sub-committee is awaiting the report of a scientific expert as to the lines on which such an investigation might best be conducted. If his report is favourable in principle the sub-committee will further consider the possibilities of the society undertaking to conduct research experiments in the direction of converting local products into suitable building materials, and to disburse any grants which the Research Committee may make for this purpose.

The report and statement of accounts of the society's branch at Johannesburg show that, like the parent society, the branch is in a sound position numerically and financially. The branch has taken its share in supporting patriotic objects both in South Africa and at home, and during the year it sent a contribution of £10 10s. to the funds of the Professional Employment Committee of the Architects' War Committee.

Generally, the aim of the council during the year has been so to administer the society's affairs and finances as to enable it to assist those members in temporary difficulties owing to the war to retain their membership, to carry on the necessary work of the society efficiently, and to support those professional bodies formed for the relief of distress or for the purpose of national service in any form. By adopting this policy the council has retained the confidence and support of the members of the society, as shown by the practically undiminished membership, strengthened its financial position, provided for contingencies, and enabled the society as a body to be of some service through the organisations it has supported, both to the profession and the community.

SOUTH AFRICAN BRANCH OF THE SOCIETY OF ARCHITECTS.

In the absence of the President, Mr. S. C. Dowsett, on active service in East Africa, the Acting President, Mr. D. Ivor Lowis, presented the tenth annual report of the branch at a meeting held in Johannesburg on October 10, 1916.

The total membership is fifty-five—a decrease of four. The death of Mr. J. D. Anderson, of Durban, was a great loss to the profession, the branch, and the society. Some 30 per cent. of the members are on active service, including the retiring President.

The financial position is sound, there being a credit balance in the bank of £130.

Owing to the war, the architectural classes at the S.A. School of Mining and Technology were poorly attended, and the branch prizes were not allocated in full, but a book prize of the value of £4 10s. was awarded to Mr. W. B. T. Newham, who attained a first-class pass with distinction and first place in the examination. The branch has renewed its offer of prizes to the value of £9 10s. for the forthcoming session.

The Union of South Africa Registration Bill is not being pressed by the branch at present, but at a more opportune moment the branch will resume its active propaganda in conjunction with the other architectural bodies.

The report was adopted, as was the following financial statement to September 30, 1916:—

RECEIPTS.

1915.	£	s.	d.
October 1.—To Balance	106	15	9
Moiety of Members' Fees from London	42	4	10
	£149	0	7

PAYMENTS.

	£	s.	d.
By Rent of Board-room	5	5	0
,, Prizes	4	10	0
,, Legal Expenses	5	13	11
,, Postages and Sundries	3	1	4
,, Balance at National Bank of S.A.	130	10	4
	£149	0	7

Examined and found correct,
D. IVOR LEWIS.
Acting President, D. M. BURTON.
Honorary Treasurer, E. H. WAUGH.

Clause 4 of the branch rules was altered to provide for three vice-presidents instead of one, subject to approval by the Home Council, which has since been given.

The following officers were elected for 1917:—President, D. M. Burton; Vice-Presidents, W. J. McWilliams, H. G. Veale; Hon. Secretary, M. J. Harris; Hon. Treasurer, D. M. Sinclair; Council—S. C. Dowsett, E. H. Waugh, D. Ivor Lewis, J. F. Beardwood; Auditor, J. S. Donaldson.

The meeting approved, subject to confirmation by the Home Council, which has since been obtained, the following resolutions agreed by the branch representatives at a joint conference of architectural bodies held at Johannesburg on June 28, 1916:—"That this meeting expresses its confidence in the Registration Committee recently appointed by the Association of Transvaal Architects, and considers that the Registration Committee appointed by the various centres constitutes the proper body to act on behalf of the united profession in South Africa." "That this meeting affirms its sympathy with the proposal to preserve the identity of the existing South African architectural societies for local purposes, but to affiliate the said societies with a new organisation—namely, the South African Institute of Architects—to deal with broader questions."

The meeting closed with votes of thanks to the retiring officials and members of council.

MAKING ROOFING AND WALLPAPER FROM WASTE TANBARK.

A method of using waste hemlock tanbark to replace partially expensive rag stock in the manufacture of felt roofing has been developed at the United States Forest Products Laboratory, and is now being used commercially by co-operating mills, according to an announcement made by the Forest Service. It is stated that in these mills from 20 to 30 per cent. of the rags is being replaced by waste bark, and that the quality of the finished product is equal to that manufactured solely from rags. Members of the Forest Service who have been conducting the experiments say that the utilisation of the bark will make it possible to effect a considerable saving in the manufacture of felt roofing.

According to the census of 1909, over 698,000 tons of hemlock bark were produced each year in the United States. After the tannin is extracted this bark is used for fuel purposes, for which it is said to have a value of 60 cents per ton.

The extent of the savings rendered possible by the new methods is pointed out by the fact that the roofing mills of the United States have a total estimated annual production of 237,000 tons of finished roofing of all kinds, equal to about 11,300,000 "squares." By a square of roofing is meant 100 square feet. The utilisation of the waste bark in this industry should, it is said, enable the mills to reduce their manufacturing costs appreciably.

In addition to the use of bark in roofing, papers made by the Forest Products Laboratory on the basis of 80 per cent. of waste tanbark have been successfully printed on a commercial twelve-colour wallpaper printing machine, and give promise of being entirely satisfactory. Other paper of the same make-up has been made into fibre conduits by a commercial manufacturer.

Other possible uses of waste bark which suggest themselves, say the Forest Service paper experts, are the use of bark mixed with ground wood for the production of wall board, or with sulphite screenings in the manufacture of car liners. Studies already made at the Forest Products Laboratory indicate that it may be possible to use waste hemlock and oak tanbark in making a large variety of pulp products.

OBITUARY.

Mr. Anderson Hague, a well-known artist, died at his residence at Deganwy, Conway, on Sunday week, aged sixty-six. Born at Manchester, he studied at the Manchester School of Art, and soon gained a recognised position as a landscape painter. He exhibited regularly for many years at the Royal Academy and was a member of the Royal Institute of Painters in Water Colours, and vice-president and one of the founders of the Royal Cambrian Academy at Conway. His art was essentially English.

Mr. Charles Henry Talbot passed away at his residence, Lacock Abbey, on Tuesday, week, in his seventy-fifth year. The deceased gentleman was the son of Wm. Henry Fox Talbot, who was born in 1800 and died in 1877, and who shared with Daguerre the credit of inventing photography and the sole distinction of its application to photo-engraving. With Mr. C. H. Talbot, who was a bachelor, the male line again comes to an end. Mr. Talbot, whose death we now record, loved the old abbey where he lived all his life. He welcomed the Wiltshire Archæological Society to it on several occasions, and in the early eighties the British Archæological Association, at its meeting in Devizes, included it in a week's itinerary. It was, of course, greatly altered from its conventual character by William Sharington when he converted it into the house of a Tudor gentleman. It remained substantially as he left it throughout the seventeenth and part of the eighteenth century, but considerable modifications of Sharington's work were made by John Ivery Talbot and W. H. Fox Talbot. There remain, however, a pleasing cloister court, in which is the gravestone of the foundress of the abbey and several of the domestic buildings of different dates. The work of restoration, which was both conservative and careful, was continued by Mr. Talbot, who reserved one-half of the income of the estate for the purpose, and the picturesque houses in the villages are memorials of his architectural zeal. The parish church, of which the Talbots were lay rectors, was particularly the object of Mr. Talbot's study and care, and he restored the chancel in memory of his father.

TRADE NOTE.

Boyle's latest patent "Air-Pump" ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, E.C., have been employed at the City of London Guardians' Institution, Bow Road, E.

The death is announced of Mr. Thomas Lowe, J.P., of Tamworth, who was mayor of the borough in 1908 and 1909. He had been in practice in Tamworth as an auctioneer and valuer for over forty years. On the formation of the Tamworth Public Cattle Sales Company, Limited, he was appointed manager, and jointly with his partners held the position until the time of his death. Mr. Lowe was 72 years of age.

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OPEN-AIR SCHOOL ROOMS.

At the November meeting of the Pennsylvania Chapter of the American Society of Heating and Ventilating Engineers the topic of the evening was "Open-Air School Rooms," and a paper was presented on this subject by Dr. Walter Roach, of the Philadelphia Bureau of Health.

After outlining the necessity for open air school rooms and the advantages to be derived from their use, Dr. Roach illustrated the work being done in Philadelphia along these lines by means of motion pictures. The address by Dr. Roach was as follows:—

"There are in the public schools of the United States to-day upward of 22,000,000 pupils, and careful physical examinations by school physicians of about 8,000,000 of these children in the larger communities has disclosed the fact that two or more million are under-nourished—anæmic, and pretubercular. If the same proportion obtains (and it probably does) we have scattered generally throughout the schools of the land nearly 5,000,000 children who should be in open air school rooms.

"Since the original experiment at the Forest Schools of Charlotteburg taken up by progressive school men in England and started in this country at Providence, R. I., as late as 1898, the idea has been gradually spreading through the United States until to-day we have no less than eight hundred open-air schools, and nearly five thousand open-window class-rooms harbouring twenty thousand children from Maine to California. The reports gathered from the teachers in these class-rooms and the school medical inspectors, under whose care the experiments have been made, show with uniform constancy, regardless of climate, longitude and latitude, that the improvement in these children is most marked.

"This can be more clearly illustrated by an individual experiment conducted during the fall and winter and spring at the Alexander Dallas Bates School, Philadelphia, where an opportunity was afforded to study the effects of a fresh air at low temperature on the physical and mental processes of children. Two groups of normal third-grade pupils were available for the test. One group occupied a room heated and ventilated in the usual manner, and the other group (with the consent of their parents) were taught all through the winter in a class room with the windows wide open. Desk-chairs were provided for routine work in this room. These could easily be moved by the pupils to clear the floor space for physical exercises. Sweaters, toques and knitted gloves were provided for use in exceptionally cold weather and soft woollen blankets to protect the children's lower extremities from the cold floor. In all respects the room was equipped like the ordinary class-room except that it was cut off from the regular heating plant of the building and the windows kept wide open. The regular school programme was followed during the term, the pupils were not fed at the school, none was tubercular. The two classes were as equally balanced as possible, assigned to two teachers of equal merit, each teacher receiving an equal number of the bright, the near-bright, and the retarded pupils of the grade, as the promotion tests had determined them at the close of the preceding term, before any thought was entertained of this experiment. The mental qualifications of each child were well known. There was no other selection, the children coming from the same kind of homes, so that the test was reasonably fair.

"Each week we weighed these children (forty-four in each classroom), watched their study and their play, and otherwise compared them.

"In the open-window room the average gain per child was 2 1-5 lbs. in each three months, while the same number in the warm-air room for the same periods averaged but fifteen-sixteenths of a pound gain. This gain was remarkably uniform, boys and girls alike, normal and sub-normal alike, and was pretty evenly distributed throughout each class. The open-air pupils were better behaved, were more alert, quicker to learn, requiring less review work, and very little discipline; they were almost entirely free from day-dreaming, were happy at school, and very regular in attendance. To determine the effect of mental stimulation of the fresh, cool air as compared with study-work in the warm-air room the school principal conducted frequent tests in memory work, spelling, and arithmetic, calculated as far as possible to eliminate the question of the merit of the teaching. These tests were applied at unexpected times on different days, covering a period of many weeks, with the temperatures ranging in the open-window room from 48 to 50 degs. F., and in the warm room from 68 to 72 degs. of temperature. The percentages were calculated for the groups, and in every particular the fresh-air groups were found to have the decided advantage. As an evidence of interest shown by parents in this method of vitalising their children, many letters were received by the principal of this school after the mid-winter promotion because some of the open-air children in this graded school were to be promoted into upper-grade classes in warm rooms, requesting that such children be restored to open-window class-rooms, with the result that the district superintendent found himself required to organise additional open-window rooms in that school.

"An experiment of this sort can easily be tried in the schools of any town or city. It is not designed, it should be noted, for tubercular or physically deficient children, but for normal, healthy children, in order to maintain their health and steady growth and quicken their powers of study.

"The influence of cold is to create a desire for active exercise, a natural physiological demand for increased circulation. To meet this need a series of short physical exercises are required at frequent intervals in cold weather between lesson periods. Such exercises should be designed to produce thoracic elasticity and promote normal chest expansion and deep breathing. The children should be impressed with the necessity of thoroughly ventilating the lungs, as well as the room. In no case should exercise be prolonged to the point of fatigue, nor allowed to become sufficiently active to produce perspiration. To properly carry out such exercises ample unobstructed floor-space is essential, and can easily be secured in the most practical way by equipping the room with movable school furniture, which the children can themselves easily move aside without noise or confusion and back in position when the exercises are completed."

DURABILITY OF STUCCO AND PLASTER CONSTRUCTION.*

By R. J. WIG, J. C. PEARSON, and W. E. EMLEY.

Owing largely to its general attractiveness the so-called "stucco house" has become very popular in recent years, especially in the suburban districts of large cities. In fact, the increase in the use of stucco for residence construction has been so rapid that there has been little opportunity to observe whether the methods and materials commonly employed in this class of construction will stand the test of time and insure satisfactory service and durability. In consequence, many inquiries are received by the Bureau on this subject, a considerable number of them being prompted by the knowledge of failures or of cases in which stucco has not proved satisfactory.

Five years ago (in 1911) the Bureau, in co-operation with the Associated Metal Lath Manufacturers undertook to carry out some exposure tests of metal lath plastered with various plastering materials for the purpose of determining the durability of different types of lath and the best methods of construction to insure the protection of the metal from corrosion. These tests (which are still in progress) have demonstrated that painted or preferably galvanised lath well embedded in a dense, water-resistant stucco should preserve the metal indefinitely under normal conditions of exposure.

Not all of the plastering materials used in these tests were satisfactory, and it was the desire of certain manufacturers to have the tests repeated or extended with certain modifications in the mixtures and methods of application. In the meanwhile, information was accumulating which indicated that corrosion of the metal lath was not by any means the only fault to be overcome in stucco construction, and suggested that an investigation of the entire subject would be of value to architects and contractors as well as to prospective house owners.

The natural interest of the manufacturers of cement, lime, gypsum, metal lath, hollow tile and many proprietary materials in this subject suggested the desirability of calling a conference and planning further work in co-operation with an advisory committee composed of members of the industrial organisations concerned, together with representatives of the Bureau. This committee was organised in 1914 and its membership now includes representatives from the Supervising Architect's Office of the Treasury Department, the American Concrete Institute, and three contracting plasterers of wide experience from as many large cities, as well as representatives from the industries.

This committee by frequent conference and correspondence drew up a programme for a comprehensive investigation of stucco construction, to be followed later by an investigation of interior plaster construction. In 1915 the plans of the committee materialised in the erection of a test structure on the Bureau grounds containing 56 experimental stucco panels, each approximately 15 ft. long and 10 ft. high. The building itself is 200 ft. long, 26 ft. wide, and 24 ft. high, the interior being available for the erection of plaster walls and partitions of various types. The stucco panels, which were completed in November, 1915, represent practically all the common types of stucco construction, a variety of mixtures being used on metal lath, wood lath, hollow tile, brick, concrete block, plaster board, gypsum block and concrete bases.

In April, 1916, a careful inspection of the condition of the panels was made and a progress report drawn up for publication, together with a full description of the test structure.

This report shows that only two of the 56 panels were entirely free from cracks six months after the panels were erected, and a number of them were in very poor condition. On the other hand, about 40 per cent. of the panels were rated as satisfactory, the remainder being in various stages of deterioration. While the condition of the test panels as a whole is rather discouraging, it should be mentioned that the smooth type of finish employed, commercially known as sandfloat finish, is well adapted to bringing out the small defects, such as cracks, blotches, uneven texture, etc., and since it must be assumed that commercial stuccos are subject to these defects in even larger measure than the carefully constructed test panels, the advisability of using the rougher finishes is apparent.

Up to the present time the investigation has shown the necessity for further experimental work, and no attempt will be made to draw up even tentative specifications until the results of this work can be compared and combined with the results of an extensive field investigation. In the latter an endeavour will be made to subject the condition of stucco houses or buildings which have been standing preferably five years or longer, in order that reliable data may be obtained on the durability of different types of stucco on different bases in different parts of the country.

The present progress report does not, therefore, include definite recommendations for stucco construction, in accordance with the decision of the advisory committee that the tests have not gone far enough to warrant general conclusions. Nevertheless, a study of the forms of construction and the present condition of the panels, which are fully described in the report, will yield much suggestive information to those who are especially interested in the subject.

* Abstract of Technologic Paper No. 70 of the U.S Bureau of Standard Notes.

The war shrine at St. Barnabas Church, Ealing, is to take the form of a lych-gate in the church grounds.

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Building Intelligence.

Coventry.—There is to be no formal ceremony of opening the fine pile of buildings which are now the Council House of Coventry—but several departments of the corporation are now taking possession of the quarters appropriated to their use, and as the furnishing proceeds the whole of the offices will be occupied. The street frontages are carried out in Runcorn stone, with roofs of Cotswold stone, in the style considered best to harmonise with the surroundings and the ancient traditions of the city. The frontage to St. Mary's Hall is in brick and stone, in the designing of which the foregoing considerations have been taken into account. In the half-basement accommodation is provided for the weights and measures department, together with storerooms, etc., and there is also included a recreation room for the police. On the ground floor are the city treasurer's, rates, electricity, and gas departments. The town clerk (Mr. G. Sutton) has rooms on the first floor, and the city engineer is on the same floor. Disconnected from these is the council suite of rooms, overlooking St. Mary's Hall. This consists of council chamber, which is 60ft. by 33ft., with ante and committee rooms and Mayor's parlour. Approached by a separate staircase is a small public gallery. The second floor is occupied by the education department and the medical officer of health. The building has a frontage to Earl Street of 275ft., to St. Mary's Street 116ft., to Hay Lane 53ft., facing St. Mary's Hall is a frontage of 270ft. The cost of the building work has been about £60,000, and the expenses of furnishing have to be added to this sum.

Swansea.—The Hotel Cameron, Swansea, has been erected on the site formerly occupied by "Ye Olde Cameron Arms Hotel," one of the oldest and most famous posting-houses in South Wales. The principal façade is carried out in red Wilderness stone to the second-floor level, and in red pressed bricks with stone dressings above that level. The ground floor contains, in addition to the large banqueting hall, grill-room, lounge bar, luncheon bar, and billiard-room premises, besides ample cloak-room and servery facilities. The basement premises contain the kitchen offices. The first floor contains residents' billiard-room, ladies' drawing-room, coffee-room, and a fine commercial room about 40 ft. square. Some 100 bedrooms are provided in the various other floors. The total cost of the premises, including the works carried out in the first instance, was about £45,000. The completion of the premises was carried out to designs prepared by and under the superintendence of Mr. Charles T. Ruthen, M.S.A. We illustrated the building in our issue of April 2, 1915.

FIFTY THOUSAND BUILDING TRADE WORKERS WANTED.

TRADE UNIONS' SUGGESTIONS.

A detailed scheme of ways and means for providing building trade workers has been formulated by representatives of the Building Trade Unions and submitted to the Munitions Labour Supply Committee.

In the near future the Building Trade Unions have been informed that there will be required 3,065 carpenters and joiners, 160 painters, 47 plasterers, 512 brick-setters, 265 plumbers, 10,300 labourers, and that subsequently 50,000 men of all trades will be required.

In order to meet this impending demand, the following proposals have been put forward on behalf of the Trade Unions involved:—

To release men now employed in the building trades on private works and on non-urgent undertakings.

To endeavour, by offering good rates of wages, to attract workmen from non-urgent work to building employment who left that work for other trades.

To adopt the scale of allowances as stated on page 18 of the "Handbook on Controlled Establishments."

To check the military enlistment of workmen now employed in the building trades.

To arrange to bring over from Ireland to this country bodies of Irish workmen suitable for employment in the building trades.

To arrange joint efforts between the Labour Exchanges and Building Trade Unions for securing men for building trades work who are suitable for such work, but who are now employed on private work.

To consider the question of forming a representative joint committee to give effect to this and other means of securing the men required.

As to wages, the Trade Unions suggest:—"That 10d. per hour shall be the rate of wages for all labourers sent to munition factory work, and that the London rate of wages shall apply to all craftsmen sent to munition factory work."

Meantime, all building trade workers, not engaged on munition work, have been advised to enrol as munition volunteers.

LEGAL INTELLIGENCE.

Alleged Conspiracy to Defraud.—An alleged attempt to defraud the inhabitants of Sheringham came before the magistrates at Cromer Petty Sessions last week, when James William Weston, a builder, of the Nest, South Street, Sheringham, and Kate S. Westgate, widow, now of Bournemouth, but formerly of Cromer and Sheringham, were charged by the Erpingham Union Assessment Committee with conspiring to defraud the inhabitants of Sheringham with respect to rates levied on a boarding-house at that parish known as Southlands. Mrs. Westgate was further charged with wilfully giving false evidence before the Assessment Committee, and Mr. Weston was also charged with "counselling and procuring" the commission of that offence. According to the statement for the prosecution, Mr. Weston having built the boarding-house by June 20, 1912, it was assessed by the overseers at £120, but they were told by Mr. Weston that he had let it to Mrs. Westgate at £100 a year, with the option of purchase, and thereon the house was assessed at £100 gross and rateable £50. The Assessment Committee thought this too low and altered it to £150 gross. Mrs. Westgate appealed and produced a lease letting the property to her by Mr. Weston at £100, whereon the Assessment Committee reduced the assessment to £100 gross. Mrs. Westgate became bankrupt later, and at her public examination on November 21 last said that, although she had hired the house at £150 a year, she had taken a legal document representing the rent at £100. Afterwards, she stated, she became somewhat nervous about it and consulted her solicitor, with the result that she and Weston went to London and jointly instructed a solicitor to prepare a new lease. That was on April 14, 1913, and was signed by both. It provided that this same property was let, notwithstanding that there was already a lease for ten years at £150 a year for ten years, and in this there was the option of purchase at £2,500. It was suggested that there was some serious ulterior motive in leaving out the sum of £2,500 from the first lease and then putting it in the second. That was so far as Mrs. Westgate was concerned, and seemed to be a clear attempt to perpetration of fraud upon the Assessment Committee and upon the ratepayers of Sheringham. For the defence, it was contended that at the time of the first letting of the house at £100 Mr. Weston did not know what the building would cost; it was at the time honestly thought by Mr. Weston that £100 would be a proper rental, and accordingly a lease for ten years at that annual rental was drawn up. It turned out that it was necessary to have another lease, because he found he had spent so much on the building that he could not afford to let it at £100. Soon after a new lease for £150 was executed. How was Mr. Weston responsible for what Mrs. Westgate did before the Assessment Committee? How could he defend himself? Not a single word of what happened at the bankruptcy proceedings was evidence against Mr. Weston. They knew what the relations were between the parties, and it might be that Mrs. Westgate, when she had to file her petition in bankruptcy, was not very friendly disposed to Mr. Weston, and let her tongue run away with her in making accusations against a man who in fact caused her bankruptcy, in having had to press for his rent. It was a polluted source from which her evidence came, and, also, they had been told that such evidence must not be used against Mr. Weston. He contended that no jury could convict Mr. Weston on such evidence. What was there to prove that he had defrauded the ratepayers and hoodwinked the Assessment Committee? At any time the Assessment Committee might have found out there was a new lease, for, so far as he was concerned, everything was put right in 1913, and it had taken the Assessment Committee three years to some to the conclusion that it had been hoodwinked. A point had been made with regard to the inclusion in one of the leases of the purchase price. It was easily answered, because when the first lease was prepared it was not known what the building would cost, and it was impossible to fix a purchase price. Mrs. Westgate used the first lease before the Assessment Committee for her own purpose; it was of no benefit to Mr. Weston. The Chairman: Oh, what about Schedule A, land taxes, and so on? Mr. Dodson: For income-tax purposes I agree he might benefit, but if it is suggested he is guilty of an offence under the Revenue Act, there has been no charge issued against him. Mr. Reeve: There may be. The magistrates decided that a prima facie case had been made out, and both defendants, who in answer to the charge pleaded not guilty, were committed for trial at the Assizes. Each defendant was allowed bail in their own surety of £20.

Party Wall Trespass.—An action was heard at Greenwich County Court on December 22, before his Honour Judge Grainger, when Mr. George Martin, 19, Eltham Road, Lee, sought an injunction to restrain Mr. Robert Findlay, his next-door neighbour, from committing acts of alleged traspass by making unauthorised additions to a party wall, and by extending the roof of a structure in such a manner that the drip would fall within plaintiff's property. At the same time he claimed £50 as compensation for damage done by damp to his house as a result of defendant's action. Counsel were engaged on both sides, Mr. Champion being for plaintiff, and Mr. Moore for defendant. His Honour, by consent, gave judgment for plaintiff, with £20 damages, and costs.

A memorial tablet to the late Dr. E. G. Archer has been erected on the north wall of St. Mary's Church, Feltwell. The tablet is of brass, mounted on a light granite foundation.

Mr. Will Dyson, the caricaturist, has been appointed the official war artist to the Australian force. He is an Australian, born at Ballarat in 1883, and recently visited the British front, where he made his first essays in war drawings.

Since the failure of the boring for underground water supplies the Rochdale Waterworks Committee have been on the look-out for fresh sources of supply, and we hear that the new works sub-committee are now in negotiation with the Bacup Corporation.

Colonel George Frederick Allender, of The Cottage, Vyner Road, Bidston, Cheshire, architect, who was at the outbreak of war appointed Deputy Assistant Quartermaster-General, Western Command, who died on September 29, has left estate valued at £22,396 gross.

Mr. William Dickson, a West Lothian mining expert and contractor, and a shaftsman named Templeton, were buried on Monday in last week at the Harthill Colliery under a fall of débris. They were enlarging an air case at the time. Dickson was killed and Templeton was severely injured.

In a sale of furniture and objects of art at "Wonham," Devon, conducted by Messrs. Osborn and Mercer, of London, a pair of Louis XVI. settees realised 4,350 guineas, a commode of the same period 1,250 guineas, a small table 105 guineas, two Louis XV. armchairs 175 guineas each, and two small pieces of tapestry 720 guineas.

The death of Mme. Helen Baron, *née* Stigand, has taken place at Saltwood, Kent. She was well known some years ago as a clever landscape artist. She exhibited in the Royal Academy, the Dudley Gallery, the Society of British Artists, and the Paris Salon. The Government acquired her full-sized copy of Turner's "Dido Building Carthage," hung in the Beaux Arts. Her work was also known at most of the colonial and foreign exhibitions.

The Halifax Corporation have considered a proposal to construct a sewer for the drainage of Mixendon at an estimated cost of £5,000. An agreement is proposed with Mr. I. A. Bulmer, Mixendon Mills, to treat the effluent from those mills, subject to Mr. Bulmer paying £500 towards the cost of the sewer, and £3 per million gallons additional effluent treated, guaranteeing that the payment for the next five years shall be not less than £50 per annum.

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Our Office Table.

Since the outbreak of the war house-building has been practically stopped in Scotland. The rush to Glasgow and other munition-producing districts has created a house famine in some localities, and there is a good deal of over-crowding. The rapid growth of the number of naval workers at Rosyth has resulted in a house famine at Dunfermline and in some quarters of Edinburgh in which the workers are settling down. In the Dalry district of Edinburgh, for instance, there is hardly a vacant house under £20 rent. The Scottish National Housing Company, formed to erect new houses at Rosyth, has stated that instead of the 900 houses which they promised the Government to have ready at Rosyth by March, 1918, they hope to have 1,600 houses ready by the end of 1917. By a new agreement with the Treasury the company are enabled to make contracts for the erection of the new houses at the war prices now ruling. In addition, it has been arranged that if the rents received for the houses built in war time are insufficient to pay all charges, including a 5 per cent. dividend, the Treasury will make good the difference to the company.

Under the joint auspices of the New York State Commission on Ventilation, the American Museum of Natural History, and the American Museum of Safety, an investigation of three of the best methods of determining the amount of dust in air has been carried out by Messrs. G. T. Palmer, L. V. Coleman, and H. C. Ward, and the results obtained are given in Vol. VI. of the *American Journal of Public Health*. In the first of the methods investigated the dust-laden air is forced against a surface smeared with glycerine, and the number of dust particles caught by the glycerine on selected areas of the surface counted under the microscope. In the second method the air is drawn through syrup, which is afterwards diluted with water, a drop of which is placed in a shallow cell under the microscope, and a count made in the same way. In the third method the air is drawn through a spray or curtain of water, which is then examined under the microscope as in the second method. In the second and third methods a rough determination may be made by a comparison of the turbidity of the water with that of a series of prepared samples. The authors conclude that the water-spray method is the best and most convenient to use under normal conditions, and they give a number of directions as to the best way of carrying out the observations.

The church at Great Ponton is dedicated to the Holy Cross. It is a fine building, erected, according to Leland, in the year 1519, at the expense of Anthony Ellys, merchant of the staple, who lies interred in the chancel, and whose arms are represented on the different parts of the steeple with the motto: "Thynke, and thanke God of all." It is admired for its proportion, and is 78 feet high. Mr. Ellys, the builder, is reported to have sent his wife a cask inscribed "Calais sand," without any further mention of its contents. On his return to Ponton he asked what she had done with it, and found she had put it in the cellar. He then acquainted her that it contained the bulk of his riches, with which, being issueless, they mutually agreed to build a church in thanksgiving to God for having prospered them in trade.

Zeitbilder, the illustrated supplement to the *Berliner Tageblatt*, publishes the photograph of the Manger at Bethlehem sculptured in the white chalk rocks of the Champagne by a soldier of the Landsturm. The purpose of the article which accompanies the picture is to reveal "the inherent tenderness and religiosity of Germans and the softness of heart which marks even the war-worn soldiers of the West at the time of the great Christian festival of peace and good will." In this picture the Babe is shown in His crib with Joseph and Mary on either side in adoring attitudes. A Prussian soldier stands at attention at the Babe's head, with pickelhaube and rifle, and two other soldiers with bared heads stand to right and left. Three sheep are there in accordance with the usual Manger tradition, but what are we to say to the introduction of a pig nosing about in the foreground?

CHIPS.

The Newcastle-on-Tyne Education Committee have agreed to make application to the Board of Education for their recognition of a section of the Atkinson Road Higher Elementary School as a Junior Day Technical School of engineering type for the instruction of 240 boys. The cost of the provision of laboratory, workshops, offices, etc., is £2,200.

The Hotel Victoria has been taken over by the Ministry of Munitions, and the whole of Northumberland Avenue is now practically in the hands of the Government. The Hotel Metropole, the Grand, the Constitutional Club, and the National Liberal Club have all been commandeered. The Hotel Victoria was built in 1889, a couple of years after the Hotel Metropole.

Three tablets in memory of Earl Kitchener, Lieutenant Humphrey Matthews, R.N., and Flight-Lieutenant Stuart Garnett were unveiled last week in the chapel of the Heritage Craft Schools, Chailey, Sussex. At the same time a window containing fragments of stained glass from Ypres Cathedral was unveiled in honour of Canadians who fell at Ypres.

Owing to the restrictions on the use of copper St. Pancras Borough Council last week decided that for the present no applications for electric current, other than those for war purposes, be accepted. The Islington Borough Council has raised its charges for current another 10 per cent., dating from January 1, making altogether an increase of 25 per cent. on pre-war rates.

Archæology is the poorer for the death of the Rev. R. M. Serjeantson, rector of St. Peter's, Northampton, and eldest son of the Rev. W. Serjeantson, the vicar of Acton Burnel. Mr. Serjeantson's knowledge of his adopted county was shown in a variety of books and papers on the archæology of Northamptonshire, and he was editor of the two volumes of the Victoria County History of that county. His death, at the comparatively early age of fifty-five, is a great loss to his family and his parish, and his many friends.

Temporary Major J. Wightman Douglas, R.E., who has been awarded the D.S.O. for gallantry and devotion to duty in the field, is the second member of the Society of Architects serving in that branch of the army to receive this distinction during the present war. Major J. Wightman Douglas supervised the wiring of the whole line under heavy fire, and set a splendid example of courage and determination throughout. Major J. Wightman Douglas is an architect practising at Newcastle-on-Tyne.

Mr. William Hunter, of 57, Moorgate Street, died on Saturday week, at the age of eighty-two. Mr. Hunter was originally a furniture dealer, but more recently carried on business as a timber merchant. Mr. William Hunter was a Past Master of the Clothworkers' Company, and one of the auditors of the parish of St. Stephen, Coleman Street. His father was Alderman William Hunter, who, represented the Ward of Coleman Street, and served the office of Lord Mayor in 1851-1852.

At the meeting of the Carlisle Health Committee last Saturday it was reported that the town clerk had laid before a special meeting the opinion of Mr. A. Macmorran, K.C., on the case he had submitted to him with reference to the claim of the Central Control Board (Liquor Traffic) to be exempt from compliance with the provisions of the different Acts and by-laws in force in the city with regard to new buildings, and that it had been resolved, in the circumstances, that no further action be taken.

During the temporary closing, from Monday last, of the Box Tunnel, the Great Western through services will be maintained by the diversion of the trains to the Bradford or Badminton routes, and local services will be run between Bath and Box and between Chippenham and Corsham, so as to supply Box and Corsham with the best possible services in substitution of the through service they ordinarily enjoy. There will be some slight increases in the fares for single journeys, but season tickets at present available via Box may be used on the alternative routes without extra charge, although no break of the journey will be allowed.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C., and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

*****Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.**

Telephone: Gerrard 1291.
Telegrams: "Timeserver, Estrand, London."

NOTICE.

Bound Copies of Vol. CX. are now ready, and should be ordered early (price 12s. each, by post 12s. 10d.), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XLI., XLVI., XLIX., LIII., LXI., LXII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXXI., LXXII., LXXIII., LXXIV., LXXV., LXXVI., LXXVII., LXXIX., LXXX., LXXXI., LXXXII., LXXXIII., LXXXIV., LXXXV., LXXXVI., LXXXVII., LXXXVIII., LXXXIX., XC., XCI., XCII., XCIII., XCIV., XCV., XCVI., XCVII., XCVIII., XCIX., C., CI., CII., CIII., CIV., CV., CVI., CVII., CVIII., and CIX. may still be obtained at the same price; all the other bound volumes are out of print.

BACK ISSUES.

Most of the back issues are to be had singly. All back issues over one month old will be charged 6d. each, postage 1d. Subscribers requiring back numbers should order at once, as they soon run out of print.

Handsome Cloth Cases for binding the BUILDING NEWS, price 2s., post free 2s. 5d., can be obtained from any Newsagent, or from the Publisher, Effingham House, 1, Arundel Street, Strand, W.C.

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TO ARMS!

1st LONDON ENGINEER VOLUNTEERS.

Headquarters, Chester House, Eccleston Place, S.W.

ORDERS FOR THE WEEK BY LIEUT.-COL. C. H. CLAY, V.D., COMMANDING.

OFFICER FOR THE WEEK.—Platoon Commander J. O. Cheadle.

NEXT FOR DUTY.—Platoon Commander A. Gerard.

WEDNESDAY, January 3.—Instructional Class, 6.15; Platoon Drill, No. 1 Platoon.

THURSDAY, January 4.—Platoon Drill, No. 7 Platoon; Ambulance Class, 6.30.

FRIDAY, January 5.—Technical for Platoon No. 10, at Regency Street; Squad and Platoon Drill for Platoon No. 9; Signalling Class; Recruits' Drill, 6.25; Lecture on Telephones, 7.30.

SATURDAY, January 6.—Commanding Officer's Parade, 2.45, Uniform, for Drill in Battersea Park.

SUNDAY, January 7.—Entrenching at Otford; Parade Victoria (S.E. and C. Railway Booking Office), 8.45 a.m. Uniform, Haversacks, and Water Bottles. Midday Ration to be carried. Railway Vouchers provided.

MUSKETRY.—For all Companies, see Notice at Headquarters.

NOTE.—Unless otherwise indicated, all Drills, etc., will take place at Headquarters.

By order,
MACLEOD YEARSLEY, Adjutant.

December 30, 1916.

Several women architects are now employed in German military service.

Mr. Matthew Scott, of 38, St. Edmund's Road, Gateshead, builder, who died on November 3 last, left estate sworn at the gross amount of £10,565 1s. 1d., with net personalty £735 9s. 4d. Testator left his estate in trust for his wife for life, with remainder to his children equally.

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Volume CXII.—No. 3236.

January 10, 1917.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.

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OUR ILLUSTRATIONS.

"Blackfriars House," now in course of construction near the site of Bridewell Palace, New Bridge Street, Blackfriars, E.C., for Messrs. Spicer Brothers, Ltd. Mr. Francis W. Troup, F.R.I.B.A., Architect.

St. John's College, Cambridge. View along the Cam. Drawn by Mr. Maurice B. Adams, F.R.I.B.A.

A Ball-room Scheme, designed and drawn by Mr. H. Butler (from the Exhibition of the Royal Society of British Artists, Suffolk Street, Pall Mall, S.W.).

Antique Trade Deacons' Chairs, Scottish Oak Furniture at Trinity Hall, the Headquarters of the Incorporated Trades Society, Aberdeen. Measured and sketched by Messrs. J. B. Nicol and R. W. Gibbon, Architects.

Poultry Farm House, Longfield, Kent. Mr. Sidney K. Greenslade, A.R.I.B.A., Architect.

New Premises for Messrs. John Reeks, Ltd., Guildford. Mr. Leopold Martin, F.R.I.B.A., Architect.

Currente Calamo.

If, as we all hope, activity in the building trades comes when peace is made, we trust the Departmental inquiry, suspended when war began, which related to the erection of new buildings and the construction of public thoroughfares, will be resumed as soon as possible. This investigation into the control at present exercised over such works by bye-laws and special regulations, and their effect upon building, should prove fruitful. At present the control vested in local authorities differs widely in various districts, and there is a lack of co-ordination which acts adversely in many directions. So far the Committee has held about eight or nine meetings, under the chairmanship of Mr. Herbert Lewis, M.P. (Parliamentary Secretary to the Board of Education), with whom are associated Sir Randolph Baker, M.P., Mr. A. E. Collins (city engineer to the Norwich Corporation), Mr. Eustace Fiennes, M.P., Mr. W. T. Jerred, C.B. (of the Local Government Board), Mr. Raymond Unwin, and Mr. Henry Vivian. There are now one or two vacancies on the Committee, among them being the seat held by the late Mr. Pointer, M.P., and these, we suppose, will promptly be filled when necessity requires. Surely an architect of undoubted position and experience might be asked to serve?

The building trades know very well the great difficulties and serious delays that beset the recovery of their debts. These are due to the defects and the muddle of our county court system and to the anomalous position of these so-called inferior courts in their competition with high or superior courts. The war's awakening seems at last to have reached the law. Our new Lord Chancellor at once set up a Committee to look into the county court circuits, arranged more than sixty years ago, regardless of railways and based upon mediæval methods. The Judicature Commission of 1875 wanted to make all county courts branches of the one High Court of Justice, and so really courts of first instance. The plan perished under the political, and other, influence of the Bench and the Bar, and we are still where we were forty years ago. Decentralisation would be bad for the central Bar in London and for the big firms of solicitors who do agency business for their lawyer clients all over the country. Provincial lawyers generally would welcome a change by which they could both begin and finish their legal work for their own clients locally. But, of course, the present method of having an agent in London pays them both very well, and the fact that the country suitor has to bear two sets of costs does not come to much as against the weight of legal vested interests. The whole of our county court system is a confused compromise between old and new methods. The smothering power of the High Court in competition with these courts is maintained by the Bench and the central Bar in London. With unlimited jurisdiction for the county courts we should have decentralisation in legal business, local Bars, and country lawyers acting directly for their clients. Results would soon be shown in a cutting down of costs and a reduction of delays both in London and the country.

It is not surprising that the anomalies created by the increase of railway fares on journeys of over twelve miles have excited protests and a demand for revision. The passenger who travels thirteen miles to his work—and in London tens of thousands travel more—feels aggrieved that he has to pay 50 per cent. additional on the whole journey, while the man who lives only eleven miles from his work continues to enjoy the old rate. Again, many whose hours of work are early and late, are prejudiced by the fact that they are unable to obtain workmen's tickets, and others by the extensive closing of stations. If the charges are to be permanent we fear it will in many places delay or stop building, and help to crowd back the workers into the nearer suburbs and slums of London and the rest of the great towns. Whether the State is sooner or later to take over the railways and bring better organisation to bear on the problems connected with the enormous increase of traffic of late years would really seem to be one of the earliest matters for serious consideration. More than half a century since we commented in these pages on the somewhat startling proposal of Raphael Brandon, who convinced himself and many others that with proper management it would pay to carry anybody anywhere at a uniform fare of threepence. The idea startled some, but not more so than Rowland Hill's penny postage scheme had shocked the reactionaries of a previous generation. There certainly was something in Brandon's contention that a passenger gave far less trouble to his carriers than a letter or parcel.

More than a quarter of a century later came Mr. R. A. Cooper's still more revolutionary demand for free railway travel everywhere and anywhere for everybody. His idea was to save the present enormous and wasteful cost of railway administration by raising the cost of the railway system by rates and taxes, just as the London County Council did that of the Woolwich Ferry. We discussed the matter several times with him, and were decidedly impressed with his grasp of his subject, and the time and industry he had devoted to its consideration. Glancing once again through his pamphlet, which was published at sixpence by William Reeves, then of 85, Fleet Street, we confess there seems much to be said to-day—more perhaps than then—for his idea. Certainly the railroads are to all intents and purposes the highways of the public. The latter have been freed from tolls and are constantly being extended and developed by the State or the municipalities, as circumstances demand. Cooper proved that the great loss incurred by the railway companies was due to their waste of seat accommodation. He showed that in 1888 the London and North-Western ran trains for 320 days with a seating capacity of 630,040,320, which only carried 56,629,440 passengers, every empty seat meaning loss, unless it could be recouped by charging those who travelled higher fares. The pamphlet is worth careful study, and our belief is that on the lines it indicates, under the control of a really able administrator, a State management of the railways would prove one of the greatest aids to industry and a boon to all of us.

During the development of the great railway systems of the world there has been a marked increase in the length, and a relative decrease in the cost and time of construction, of the long tunnels which were necessary to carry the lines across the various Continental divides. The most important of these tunnels, at least in re

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speed of their length, are to be found in Europe, more particularly in the Alpine regions. The first of these, the Mont Cenis, built in 1857-1871, is 7.5 miles in length, and the rate of progress was 7.75 ft. per day. Then came the St. Gothard, 1872 to 1881, 9.5 miles in length, in which the rate of progress rose to 18 ft. per day. The Arlberg tunnel, 6.5 miles in length, built in 1880 to 1884, was put through at the rate of 27.25 ft. per day. The Simplon tunnel, 1893 to 1899, 12.25 miles in length, was built at the rate of 36 ft. per day; and the Loetschberg tunnel, 1906 to 1911, 9 miles in length, was built at the same rate of 36 ft. per day. It is now proposed by Brig.-General H. M. Chittenden, U.S.A. (retired), to drive a two-track tunnel through the Cascade Range of mountains, which will be 30 miles in length and have a sufficient elevation not much over 1,000 ft. above sea-level, the object of this great work being to give a short and easy cut to Puget Sound and the great seaports of the north-west, and avoid the serious interruptions and disastrous accidents, which have occurred of late years on the present high-level railroads across the mountains. General Chittenden bases his estimates on the experience had with the double-track Rogers Pass Tunnel through the Selkirk Range on the Canadian Pacific Railway, which is now nearing completion. Progress has been at the rate of about 52 ft. per day, which is a striking advance on the rate in the Simplon and Loetschberg tunnels through the Alps. To expedite the work, four shafts, from 1,100 ft. to 2,320 ft. in depth, would be sunk along the line of the tunnel, and it is estimated that with these four shafts the 30 miles of tunnel could be put through in five and a-half years at a total cost of $43,237,000.

Lord Cowdray of Midhurst has been appointed Chairman of the Air Board. In accepting this office Lord Cowdray stipulates that he does so without salary. Lord Cowdray, as Sir Weetman Pearson, sat in the House of Commons as Liberal member for Colchester from 1895 to 1910, when he was made a peer. He is the head of the firm of Messrs. S. Pearson and Sons, Limited, contractors, Westminster, whose work is world-famous. We rather regret to see it stated that the new Department is not to have full powers for the supply of machines and material to the two air services, naval and military. Apparently the supply of material will still be mainly or largely in the hands of the Ministry of Munitions. In that case we hope Lord Cowdray will see that the arrangement works better and more quickly for the supply of the two services. He will have to secure co-ordination and smooth working without exercising the full powers of a separate munitions department, if one may put it so. To bring separate departments together and co-ordinate their efforts is thankless work, just now, especially when Sir Douglas is emphasising the need for more and more aeroplanes. Meanwhile, as in one instance that came under our notice one maker is at a standstill because one department will not give him the work till he has got the machinery, which is waiting delivery, and another will not give him the permit for the machinery till he gets the contract!

An exhibition of 93 good photographs by members of the Camera Club is on view at the club's premises, 17, John Street, Adelphi, till January 31. Of principal interest to our readers are "Avila Cathedral," by Mr. J. R. H. Weaver (63), the "Shrine of Bishop Waynflete, at Winchester" (68), and a very satisfactory interior of "Segovia Cathedral" (66), both by the same. Mr. John Keane has a picturesque view of "Old Zurich" (72). "Vespers" (5), by Mr. Oscar Hardie, is attractive, and so is "Edinburgh—Winter" (6), by Mr. W. Thomas. "Houses on the Hill" (36) deserves mention, and so does "Rievaulx, Yorks" (46), by Mr. Clement Alliston. In vigorous modern contrast is a "Power Station—Chelsea" (44), by Mr. R. Belfield.

PUSH ON! KEEP MOVING.*

Two years ago—twelve months ago, on every battlefront, and here at home—we hardly dared encourage ourselves with that cure for the heartache. It was enough then to feel sure that we were one and all pledged to endurance till final victory was certain. Equally certain, alas! that, in the meantime, our bravest and best would pay the penalty of our culpable unreadiness, and that the rest of us, strive all we might, could but take up our daily tasks and be thankful if their fulfilment was to be possible much longer. Poor encouragement it seemed to some, but that it was enough to hearten us we have good reason to-day to be grateful for. The victory is not won yet. The day's record is still too often a barren one, and only a spurious optimism would deny it. But the outlook is a far more cheering one than it was this time last year. As the days lengthen, and the grey light in the east earlier and earlier prophesies the dawn, we can all up and hail each day's increased daylight, cheered whether at the post of peril, or in the stubborn determination to keep our end up in the struggle amid which our lot has been cast, to renew the "great push," never to be relaxed till the last stronghold of organised barbarism is overthrown, and the only peace worth having is made *by us*, and *on our* terms.

Of that two things only can rob us. The traitorous cowardice of those who would persuade us to accept any other, and the faintheartedness of the scarcely less disloyal to every obligation of citizenship who would exaggerate their own sacrifices, or dissuade the rest of us from pushing on and keeping moving to our very uttermost in the pursuance or endurance of our heroic or humblest share of the great contest. We know well that no such poltroonery is possible with those for whom we are entitled more especially to speak. Of all who have been called to arms, to the work of sustaining our fighting men, or the surrender of their interrupted means of livelihood few have responded more loyally and effectively, or in greater numbers. From the leading ranks of the architectural profession to the least famous, but none the less indispensable, craftsmen of the many and varied callings in the building trades, hundreds of thousands have died and suffered and endured. We who can personally count hundreds of them among our most valued co-workers, know it too well, and none will hail more joyfully the renewal of their co-operation when peace comes than ourselves and those who with us miss the generous contributions of their genius and experience to the common stock of knowledge we are enabled to garner week by week. That the time of the fruition of all the sacrifices they have made is near we have the strongest conviction if only, one and all, we "push on and keep moving."

And, when peace comes, assuredly we must keep up the great push, for in no other peaceful calling is there—thanks to no fault of ours—so much leeway to make up. From one end of the realm to the other comes the urgent cry daily for the thousands and thousands of houses for want of which our over-crowded workers are suffering in health. In every quarter works of varied nature and magnitude which have been suspended are awaiting the word that will give welcome work to the builders and remunerative returns to the nation at large for years. In scores of great towns and hundreds of less crowded localities great schemes of town-planning are awaiting execution. Nothing can hinder all this except the inertia of those whose first duty it is to push on, or the short-sighted folly of those who would stop work by industrial squables. Push on and keep moving along the lines of wisely ordered effort and commonsense all who are amenable to the call of legitimate self-interest which is always only to be obeyed if coeval with the common good.

Of that, beyond a doubt, the prosperity of the two great groups of industry—our own and the only greater one of Agriculture and all that pertains to it—is always at once the guarantee and the evidence. Fed well and housed well the British worker of all stations will work well, and every honest trade will share his prosperity, and those who make money thereby will once again seek its best investment in the one security that survives all panics, and yields returns worth ensuring. We cannot but believe that any Government that may sway our destinies here presently will recognise this, and as speedily as possible sweep away the unfair and isolated tribute exacted from the builder during the past seven years, independently of all the burdens he has borne in common with the rest of the nation. We cannot doubt that those charged with municipal and other schemes of public benefit will spoil all, and alienate the support of those most interested, as has been the case at Birmingham in the instance we commented on last week. "Push on and keep moving" against such aberrations of reason and infirmities of purpose wherever they may manifest themselves, by all means, and put every ounce of effort into the push.

We trust there is no need to express our conviction that by all of us the great push will be all-British. The experience of the past two years has abundantly proved that there is neither need of nor room for the alien henceforth. In this connection we hope not one restriction the Government has enforced will be modified. For the rest, it is well to recognise that if the home-worker is to be protected, as he should be, against the unfair competition of the foreigner, he must abandon once and for all the shortsighted policy which has in some cases driven the employer to avail himself of foreign help against his own inclination. There must be no more limitation of output, but there must be the highest wage for ability wherever it is found. There must be no protection of the unfit or the shirker, but there must be every facility given to the worker

* "Push on Moving! Keep Moving." T. Morton's "A Cure for the Heartache," Act ii., Sc. 1.

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to qualify himself and to claim the preference due to fitness. As Mr. J. R. Richmond told the Glasgow University Engineering Society the other day: "The wages of the skilled workman, when he is exercising his skill, should be on a higher level, and in every department, as the direct result of greater production, an equivalent higher rate of earnings should prevail, a more definite and logical system of grading labour and determining its productive value should be adopted. The industries of the country are no longer regarded as the property and possession of private individuals or corporations. They are regarded as public trusts whose existence in private hands is tolerated for certain benefits they confer on the community, and they must be compelled as the price of their existence to contribute more and more to the common good."

As far as our own observation extends there is every ground for hopefulness in most directions. We are heartily thankful to all who have enabled us once again, in spite of the many limitations yet imposed on us, to make this issue not unworthy of many before the war when opportunity favoured the generosity of our always willing contributors. We have not sought unduly to extend its limits, or to crowd into it extraneous matter for which few would thank us. Nor have we pressed advertisers to extend their announcements beyond their inclination. We should like to add that they, too, are "all-British," and will remain so, and that they have a very strong claim therefore on all to remember it, and also to bear in mind that in many cases they have "kept moving" and kept our readers aware of it at some self-sacrifice which well demands recognition. An advertiser who has kept his flag flying during the past two years and a-half has indeed given solid proof of the stability which is the first guarantee for good execution of work, naturally demanded by any who specify his material, or trust him to understand and fulfil their requirements. Such are well represented in our pages to-day and we ask all to note it.

MR. BERGER SEES IT THROUGH.

"I'll see it through," says the Briton, when he takes a job in hand; and the world accepts the phrase as guaranteeing a finished piece of work. To his credit the world is not often disappointed. It is in this sense that Messrs. Lewis Berger and Sons, Ltd., wish their friends to read the statement on our back-page this week. It expresses, in an easily-remembered phrase, the *dependableness* of their products—but it means more than that. It means that they do not rest at selling goods, but that their best service goes with them—the service which tries to improve business conditions; which aids the customer to get trade and to hold it; which "stands by" with help and counsel, if such be needed to secure proper results—and which proffers the wisdom of a century-and-a-half's experience.

Mr. Berger "sees it through" by placing his reputation in the package with the goods—a bold thing to do when the goods which safeguard the reputation are in daily use all over the world, and one which demands quality-maintenance as a first principle.

"Mr. Berger" is typified in the allegorical 1760 figure on our back page, and though young in the company of immortals which he now joins, he is older and wiser in colour lore than any.

Certainly no firm could more appropriately be represented in the colour schemes which are illustrated on our cover—which, by the way, has in its production gone through the press no fewer than five times. The opportunity given us by Messrs. Lewis Berger and Sons, Ltd., of producing such an issue in war time is characteristic of the enterprising policy of the firm, and deserves every encouragement.

THE IDEAL HOUSE

AND NO SERVANTS.

(From a Correspondent.)

The servant problem is always with us, and just now it is more acute than ever with so many openings for the young women who usually go out as domestic servants over and above those in everyday life. The question arises, therefore, cannot we do without them altogether, and in the following the writer has outlined arrangements by which he believes it would be perfectly practicable. He has in mind the house of eight or ten rooms with a family of four or five (two parents and two or three children), but the arrangements could be adapted to houses of almost any size. In very large houses, with a very few members in the family it will be remembered that a good deal of the work of the servants is rendered necessary by their own presence in the house. If there were no servants, even in a large house the work would be very much less. Nearly all the apparatus described is already on the market, a great deal of it being in use in hotels, restaurants, etc., while the remainder is principally the adaptation of other apparatus actually in use for other purposes.

THE WORK TO BE DONE.

The work to be done may be set out as follows:—

Warming the house in winter, cooling it in summer, and ventilating it all the year round.

Cooking the food for the family, preparing it for cooking, and washing up after meals.

Chambermaid's work: All that is done in the bedrooms by the chambermaid in hotels, including the cleaning of all the rooms, passages, etc.

The nursery: All that a nursemaid or staff of nursemaids would do where there are babies or very young children.

Answering the door, attending to tradesmen, etc.

WARMING, COOLING, AND VENTILATING THE HOUSE.

The amount of heating required in winter, and the amount of cooling in summer, would be very much reduced if the whole of the walls, floors, and ceiling were treated as cold stores are, and lined with thermal insulators. Existing houses could be lined with compressed cork and other substances, the inside surfaces being finished off ornamentally as at present. If the windows also were doubled, had two sets of sashes, as in cold countries, the heat required during the winter would be reduced even more than by insulating the walls, etc.; while during summer the greenhouse effect that windows produce would be practically eliminated, and the two sets of sashes would lend themselves very conveniently to ventilation. Heating would be by gas or electricity; preferably the latter, where it can be obtained at ½d. a unit, because each stove could be turned on from any part of the house, and electric stoves could be placed in positions where they would warm the incoming cold air. Passages and corridors would be warmed as in America, and electric fans would circulate warm air in winter and cool air in summer.

COOKING AND PREPARING FOOD, AND WASHING UP.

Cooking would be done by gas or electricity, preferably the latter, the temperatures being controlled by electric thermostats. As there would be no servants, and electric cooking is very clean, the cooking would be done in the dining-room, so that dishes and plates would require very little handling. Joints, poultry, and fish would come to the house ready to go into the oven or the pot. Potatoes and other vegetables would be prepared by one of the machines already on the market that are used in hotels, restaurants, hospitals, etc. The potatoes are put into a machine, a handle turned—it could be run by a small electric motor—and they come out ready for the pot. Other vegetables are cleaned and cut up and prepared for the pot by somewhat similar machines. Washing up is the great bugbear; it would be done by one of the dish-washing machines already in use in hotels and restaurants, made small enough for private houses. A runway, like those in butchers' shops, but ornamental in form, would carry a wire basket, into which the dirty plates and dishes would be placed, from the dining-table to the scullery, where the dish-washing apparatus would be fixed. There are many forms on the market. In a typical one there are two tanks holding water. A small jet of steam from a small boiler, heated by gas or electricity, is forced into one of them, the water also being agitated by the aid of an electric motor. The basket of plates, etc., would be lowered into this tank, where it would remain for a few minutes, all the grease, etc., being removed by the steam and the agitation of the water. It would then be hoisted out of that tank and lowered into the other one, which would contain scalding-hot water. On being lifted out of the second tank the plates would be quite clean and dry. This description is taken from actual practice.

CHAMBERMAID'S WORK.

Each bedroom would have its own lavatory basin, with a supply of hot and cold water, the water being heated by gas or electricity, at any convenient part of the house. There would also be a trapped slop sink inside a cupboard under the lavatory basin. Cleaning and dusting would be done by a vacuum cleaner, worked by an electric motor, so that the different nozzles of the apparatus would merely have to be directed to the spots desired. Scrubbing could be done when required by an electrically driven brush carried at the end of a long handle, which would also carry a supply of water. Soiled linen would be sent to the laundry, and could be thrown down a shoot, opening on the bedroom floor, into a basket on the ground floor.

THE NURSERY.

The cradle would be rocked by an electric motor, the switch controlling it being at any convenient point; and the baby's food could be warmed by an electric heater, or kept in a thermos flask. The nursery would be kept at a comfortable temperature by the means already described, and a telephone fixed there would tell the mother all that was going on in the nursery, wherever she happened to be.

ANSWERING THE DOOR.

This is, perhaps, one of the most troublesome matters of all. The house should have a porch, carefully protected from the weather. In the porch a telephone would be fixed, if necessary, inside a small cupboard. There would be a telephone in each room, and callers could speak to the mistress of the house, or any of the family, even when they were in bed. The door would be unlocked by an electro magnet, operated by a push in each room, when required to admit visitors, and would close behind them by one of the well-known door-closers. The telephone cupboard could be kept locked, and unlocked in the same way, when someone rang. For tradesmen there would be a sliding panel by the side of the door, unlocked by pressing a push, the parcels being placed on a slab inside the door, the panel then returning to its place. If desired, a simple belt conveyor could carry each parcel to the storeroom or the living-room. Milk would be the most troublesome commodity. It could be poured down a tube into a receptacle provided for it inside the door, the mouthpiece being kept closed, and unlocked by pressing a push, when the milkman arrived.

There are a number of little matters that it is impossible to deal with in the space allowed; but if builders took the matter up seriously they would be found to straighten themselves out by developing on the lines sketched above. Meanwhile, if a family keeping two servants were able to dispense with both, they should save from £80 to £90 per annum, and this means, at ½d. per electrical unit, 100 units per day. One unit will run a 20-candle-power lamp for fifty hours, and it does not require very many units to cook a dinner. Probably half of the money would be saved after paying for the electricity or the gas; and it will be remembered that £40 a year is the interest on £800 at 5 per cent., so that it should be economical in all ways.

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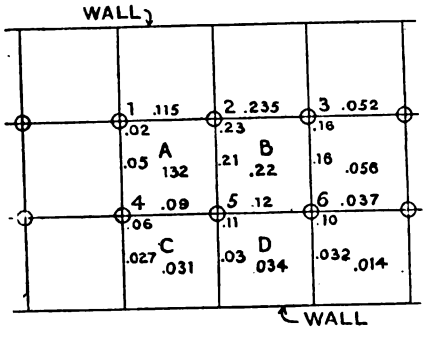
SLAB DEFLECTION AND SUBSIDENCE OF COLUMN SUPPORTS IN A FLOOR TEST OF INTERNATIONAL HALL, CHICAGO, MADE SEPTEMBER, 1913.*

By HENRY T. EDDY, C.E., Ph.D., LL.D., University of Minnesota.

Reinforced concrete floor slabs are somewhat imperfectly elastic, and in testing them an allowance is commonly made for this fact by the requirement that in case of any excessive deflection at least 80 per cent of it shall disappear within a week after the removal of the load which produced the deflection. This requirement recognises the imperfection of the elastic properties of the slab in two ways, since, first, it does not forbid some residual permanent deflection, and, further, it does not require immediate recovery—neither of which concessions could be made in case of a perfectly elastic structure.

Few materials of construction are so perfectly elastic as actually to make an immediate and complete recovery, but a much larger margin is allowed to reinforced concrete than to most other materials. It should be noticed that on account of its being a composite structure, composed partly of steel and partly of concrete, of which the steel is more nearly perfectly elastic than the concrete, a floor slab with steel massed in the column heads will have a more prompt

FIG. 1



and complete recovery than one with so-called drop heads of concrete in place of the heavy reinforcement in the column heads.

But in the retardation or time lag of slab recovery a phenomenon is exhibited which is not found to any perceptible extent in other kinds of materials of construction in ordinary use. Since recovery from slab deflection is gradual and may never be complete, and since a corresponding gradual increase of deflection must occur under a load, it has been argued by some that final stability under a load is impossible. The permanence, however, of ancient concrete structures seems to show that there must be a limit to the deformations and deflections that will take place under loads, just as there is to the recovery after removal, and it must be admitted that concrete is not really plastic, although the property of concrete to which attention has just been directed bears some of the marks of plasticity. Were concrete really plastic under ordinary stresses that fact would spell the ultimate destruction of buildings and bridges made of that material. But concrete is a kind of artificial rock, and evidently reaches, in time, a permanent and invariable state, in which progressive changes no longer take place, although, in course of hardening, phenomena may occur which, if not ultimately checked, would involve final collapse.

Now, the theory of the flexure of slabs differs from that of continuous beams in important particulars, one of which is that the applied moments and the observed resisting moments are not equal to each other, a fact the reasons for which are discussed elsewhere. But to this fact it is due that the economical and safe depths or thickness of slabs for any given span is small compared with that of beams, a fact which partially obviates one of the great drawbacks that exist to the use of continuous beams—viz., the large stresses introduced by any accidental subsidence of supports.

As just stated, one of the most serious practical objections to the employment of continuous beams lies in the very large stresses induced by settlement of supports, because this will usually entirely disarrange the stresses for which the structure was designed. This hazard has operated very largely to prevent the construction of continuous bridges consisting of several successive spans. But a subsidence of a magnitude which might produce dangerous stresses in a structural steel building may be taken up in course of construction in a reinforced concrete building without requiring special attention, since the relatively large flexibility of these slabs is such as to make the effects of moderate subsidences inconsiderable compared with the effects of subsidences of the same absolute amount in bridges and deep girders.

The structural utility of continuous panels is so great as to outweigh their risks and practically to necessitate their adoption. The fact previously stated that the applied moments and resisting moments in slabs are unequal does not, however, prevent us from applying the theory of flexure to slabs as well as to beams, although it does prevent us from calculating the moment of inertia of the resisting materials in slabs in the same manner as in beams. But those deductions from the theory of flexure which are independent of the magnitude of the moment inertia are valid equally for beams and for slabs. Such, for example, are the relative deflections and vertical displacements of different points in the span. This it is which has made it possible to treat with success an important question which arose in the discussion of the test of the floor of International Hall.

In this floor slab the foundations of the columns proved insufficient to carry the test loads without yielding by amounts large enough to have considerable effects upon the stresses and deflections of the four loaded panels, each of which was 18 by 18 feet square. The floor as tested was a deck slab with no columns on its upper side. It was three panels wide and nine panels long, and was built into the surrounding walls of an old brick building by cutting into them somewhat for space to place steel and pour concrete, so that the edges of the slab were made integral so far as possible with the walls. The four panels which were tested formed a square near the middle of one side of the slab, two of them being in one tier of wall panels and the other two in the middle tier adjacent to them. In this floor, with its two rows of supporting columns parallel to the long sides of the building, certain vertical displacements were measured at the columns and at mid-span between columns and walls, both before and a week after the removal of the final test load, and the question was to determine whether the recovery was as much as 80 per cent. of the maximum deflection, and so whether there still remained as much as 20 per cent. of the maximum. The solution of this problem implicitly requires the determination of the magnitude of the vertical displacements which would occur in the slab by reason of the subsidences of the column supports only; for the actual vertical displacement at any point of the slab is the sum of two kinds of displacement; first, that due to the bending by reason of subsidence of the points of support, and, second, that due to bending by reason of the applied load. The fact that the subsidence of columns was itself also due to the applied load is immaterial, since the effect would be the same were the subsidence due to some other cause.

When that part of the vertical displacement at any point which is due to the subsidence of supports is subtracted from the actual vertical displacement observed at that point, the remainder is the true deflection, and may be either that due to the effect of the load in bending the slab or to the residual bending effect after removing the load, according as the load is still resting upon the slab or has been removed. The ratio of the remainder after removal to the remainder before removal will show how much the recovery falls short of being complete.

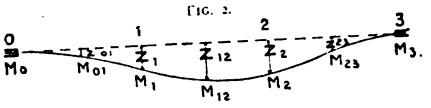
Let these four panels be designated by a, b, c, d respectively, as shown in Fig 1, with columns numbered from 1 to 6. Panel b is the centre of the entire floor. Let the reinforced direct belts extending across the slab over the columns be regarded as continuous beams fixed horizontally at the walls. The assumption that they are fixed at the walls is probably not entirely correct, but more nearly so than the assumption of mere support at the walls. It is found that the latter assumption gives results which do not differ much from those obtained by assuming the ends to be fixed in direction as well as position. If l be taken as the distance between successive columns, these belts or beam strips which may be taken roughly as having a width of 0.5 l, are not of uniform moment of inertia throughout their lengths, but will, for the purpose of preliminary investigation, be assumed as uniform, and their irregularity of cross-section will be allowed for later.

Given a uniform continuous beam of three equal spans, each of length L, as shown in Fig. 2, whose extremities are fixed horizontally on the same level, but whose intermediate points of support at points 1 and 2 are depressed by the observed subsidence z_1 and z_2, respectively, below the level of the extremities, to find the displacements z_{12}, z_{01}, z_{23}, at the middle of the centre and end spans respectively, there being no stresses or displacements due to any other cause than the subsidences z_1 and z_2.

Let M_0 and M_3 be the moments at the extremities, and M_1 and M_2 at the intermediate supports, respectively.

Then, by making use of the theorem of three moments, which applies in its general form to any two successive spans of a

FIG. 2.



straight beam with supports at any arbitrary levels, we have the following four equations by taking four successive pairs of spans, as follows:—The first pair, Equation (1), consists of a span of zero length and a span extending from the wall at 0 to the first row of columns at 1. The effect of a span of zero length is to give the slab a fixed horizontal direction at the wall. The second pair of spans, Equation (2), extends from the wall at 0 to the first row of columns, and from the first to the second row of columns at 2. The third pair, Equation (3), extends from the first row of columns at 1, across the second row to the other wall at 3, and the fourth pair, Equation (4), from the second row of columns at 2 to the second wall at 3, and includes a span of zero length at that wall.

The notation may be understood from Fig. 2, in which the tangents at the 0 and 3 are fixed in a horizontal position, and the vertical displacements or subsidences at the intermediate supports 1 and 2 are of known amounts, z_1 and z_2, and the vertical displacements at mid-span are designated by z_{01}, z_{12}, and z_{23} respectively, while the applied bending moments are denoted by the letter M, with corresponding subscripts, and the length of the equal spans between supports by L.

$$6\,E\,I\,z_1 = (2\,M_0 + M_1)\,L^2 \quad \ldots\ldots(1)$$

$$-6\,E\,I\,(2\,z_1 - z_2) = (M_0 + 4\,M_1 + M_2)L^2 \quad \ldots(2)$$

$$6\,E\,I\,(z_1 - 2\,z_2) = (M_1 + 4\,M_2 + M_3)L^2 \quad \ldots(3)$$

$$6\,E\,I\,z_2 = (M_2 + 2\,M_3)L^2 \quad \ldots\ldots(4)$$

Considering now the mid-displacement z_{12} of the middle span 12, it may be expressed in terms of the two end moments and end displacements of that span as follows:—

$$6\,E\,I\,(z_1 + z_2 - 2\,z_{12}) = \tfrac{3}{4}\,(M_1 + M_2)L^2 \quad \ldots(5)$$

as appears from the fundamental equation of moments and shears used in establishing the equation of three moments.

The solution of these five simultaneous linear equations by the method of intermediate multipliers or otherwise gives as a result

$$z_{12} = 5/8\,(z_1 + z_2) \quad \ldots\ldots(6)$$

(Continued on page 45).

* Communicated by the author to the *Journal* of the Franklin Institute.

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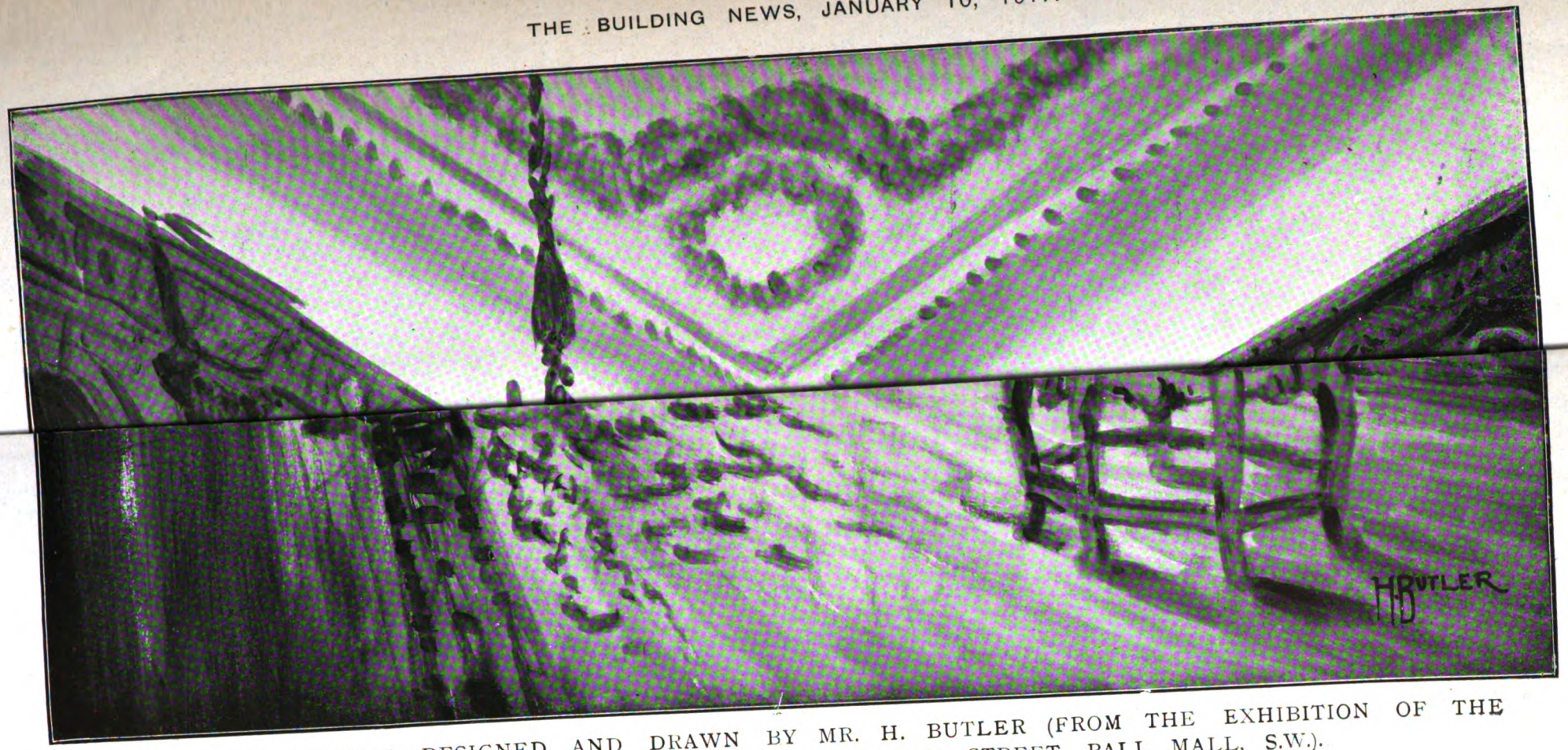

A BALL ROOM SCHEME DESIGNED AND DRAWN BY MR. H. BUTLER (FROM THE EXHIBITION OF THE ROYAL SOCIETY OF BRITISH ARTISTS, SUFFOLK STREET, PALL MALL, S.W.).

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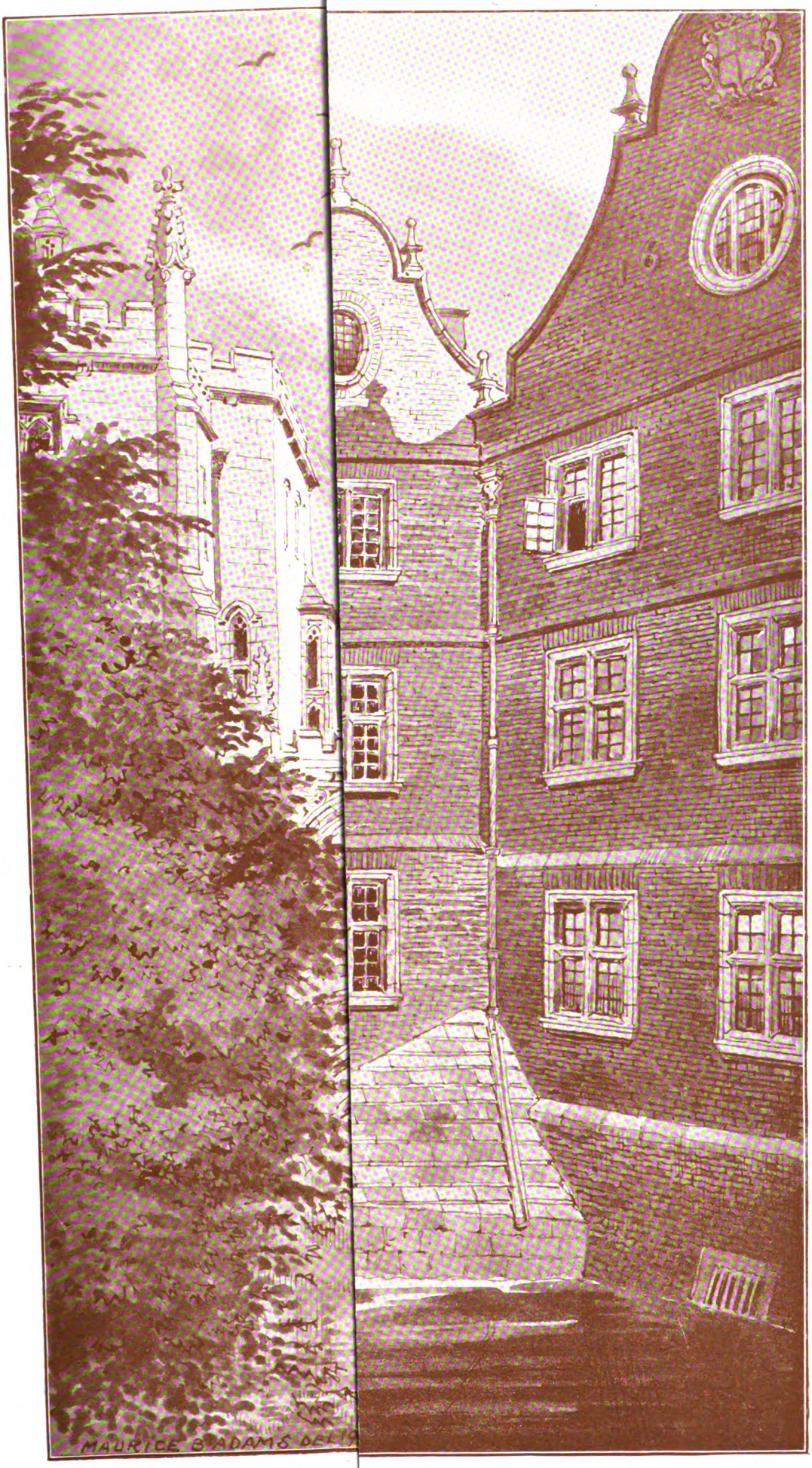

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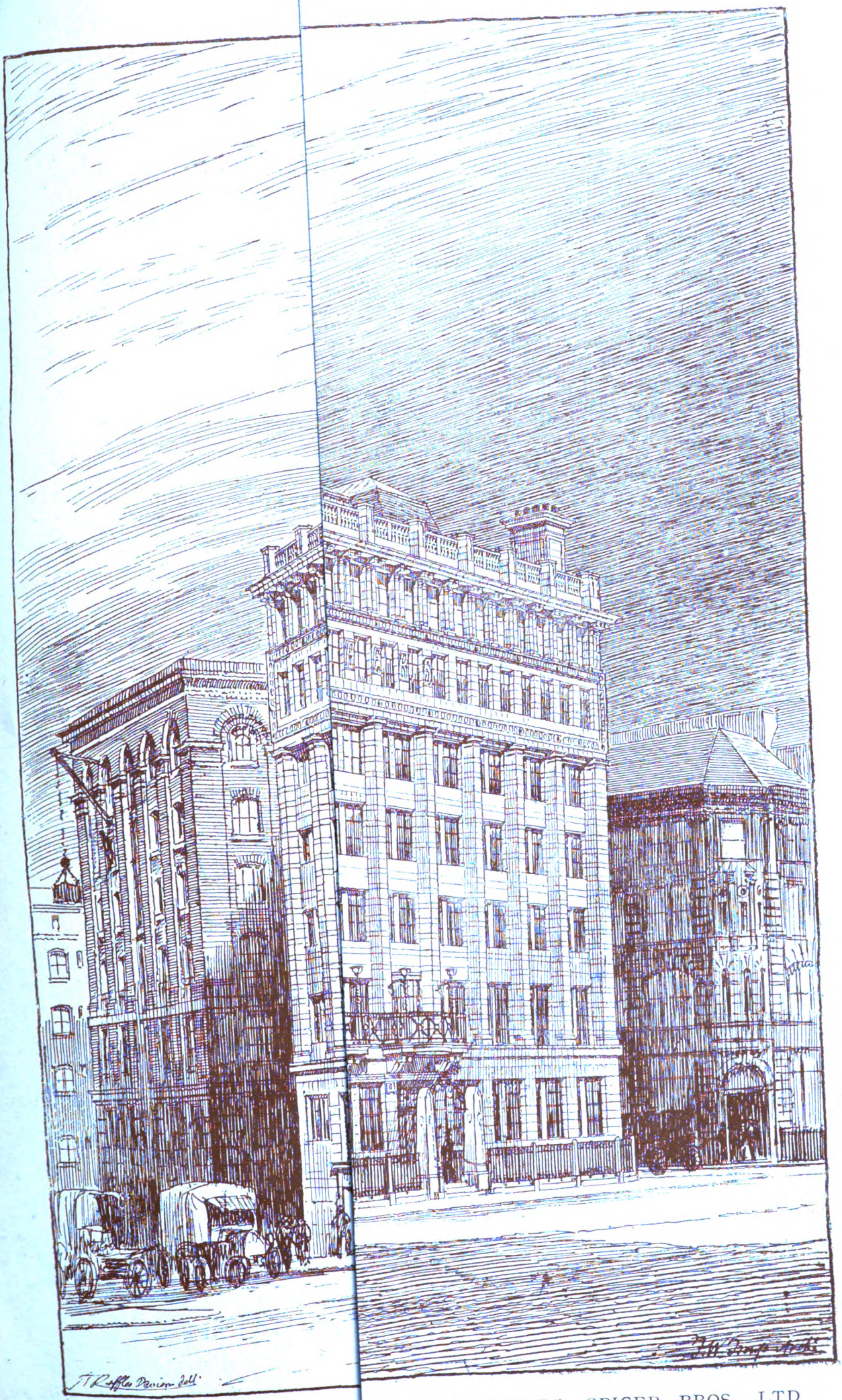

"BLACKFRIARS HOUSE," E.C., FOR MESSRS. SPICER BROS., LTD

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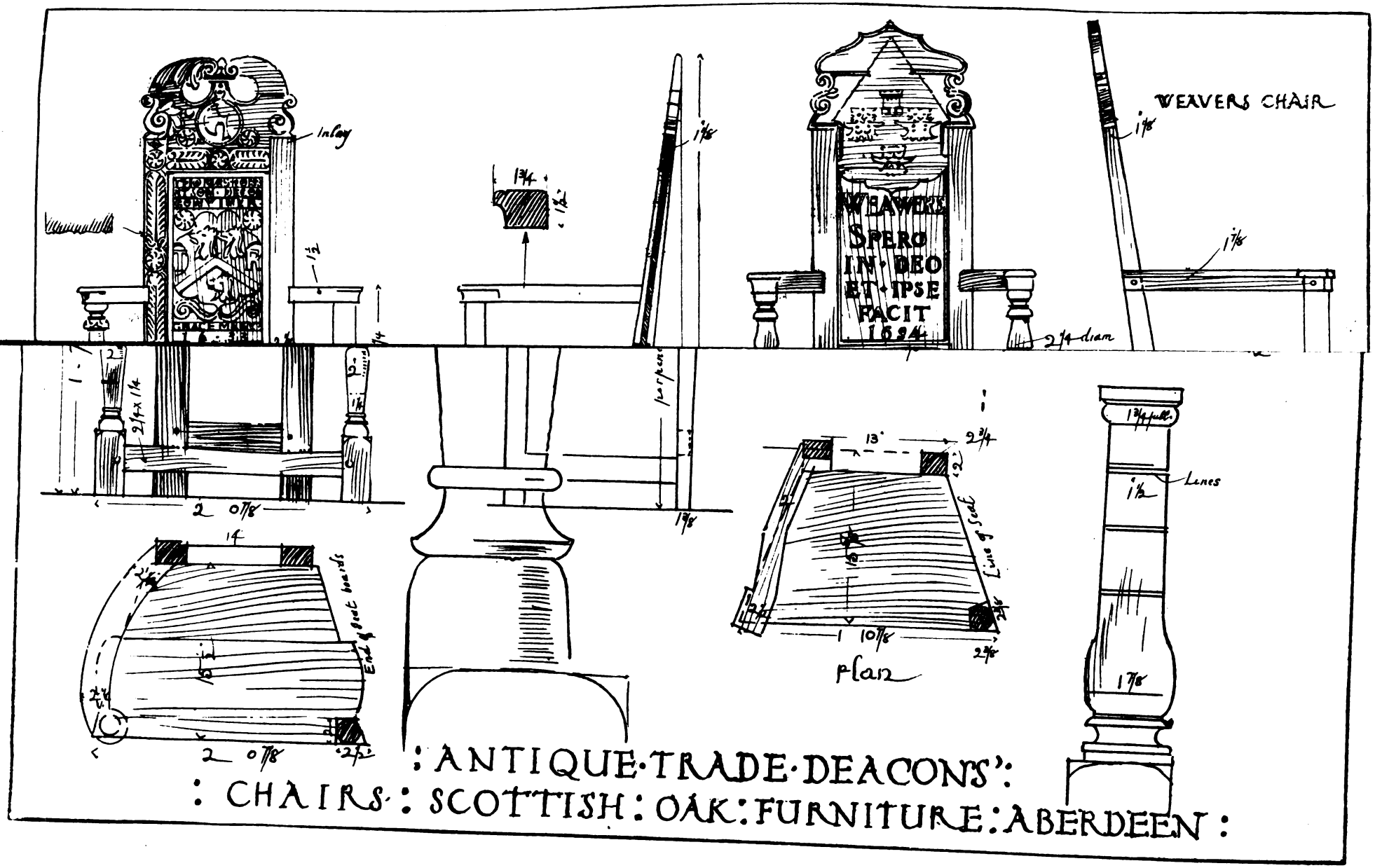

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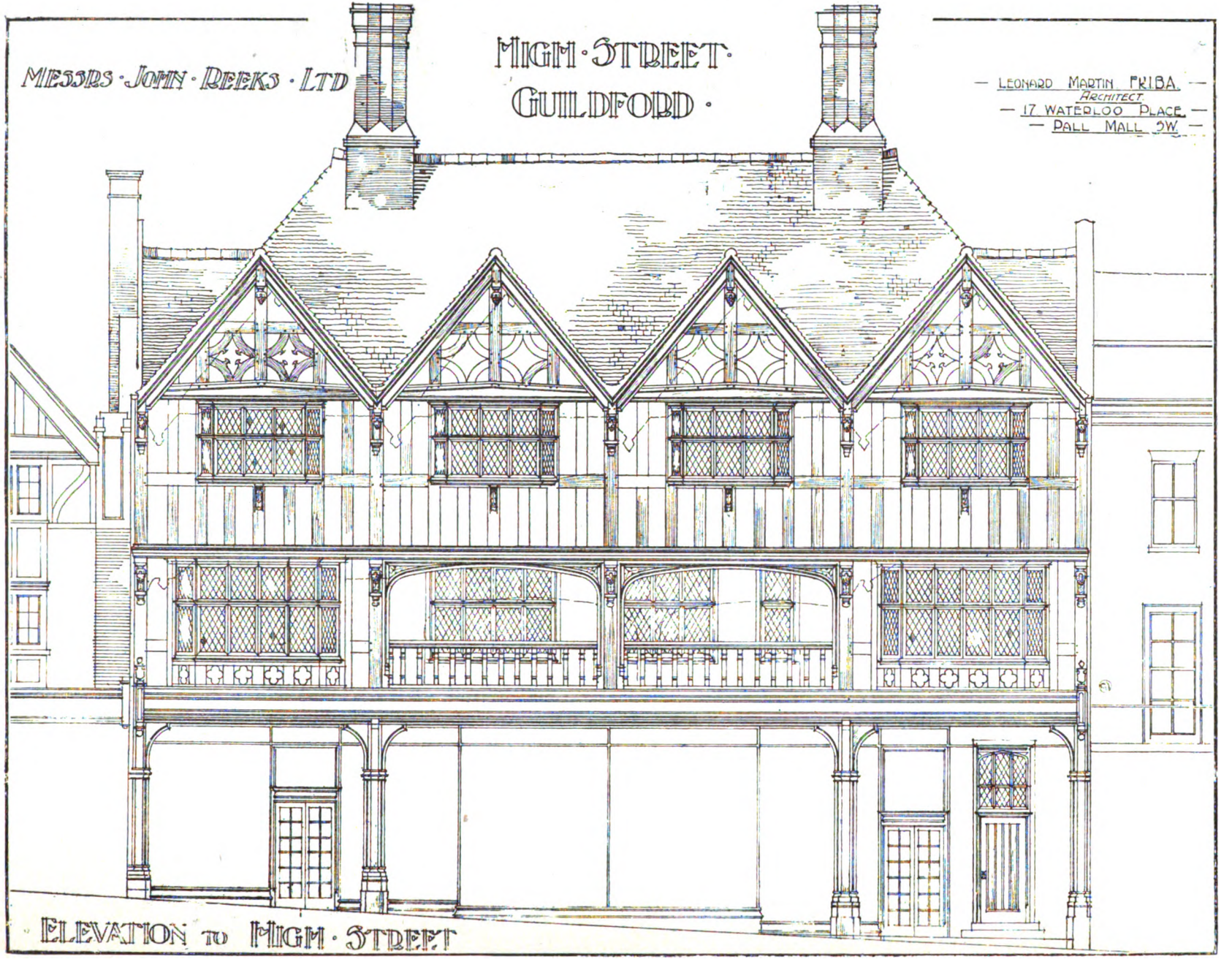
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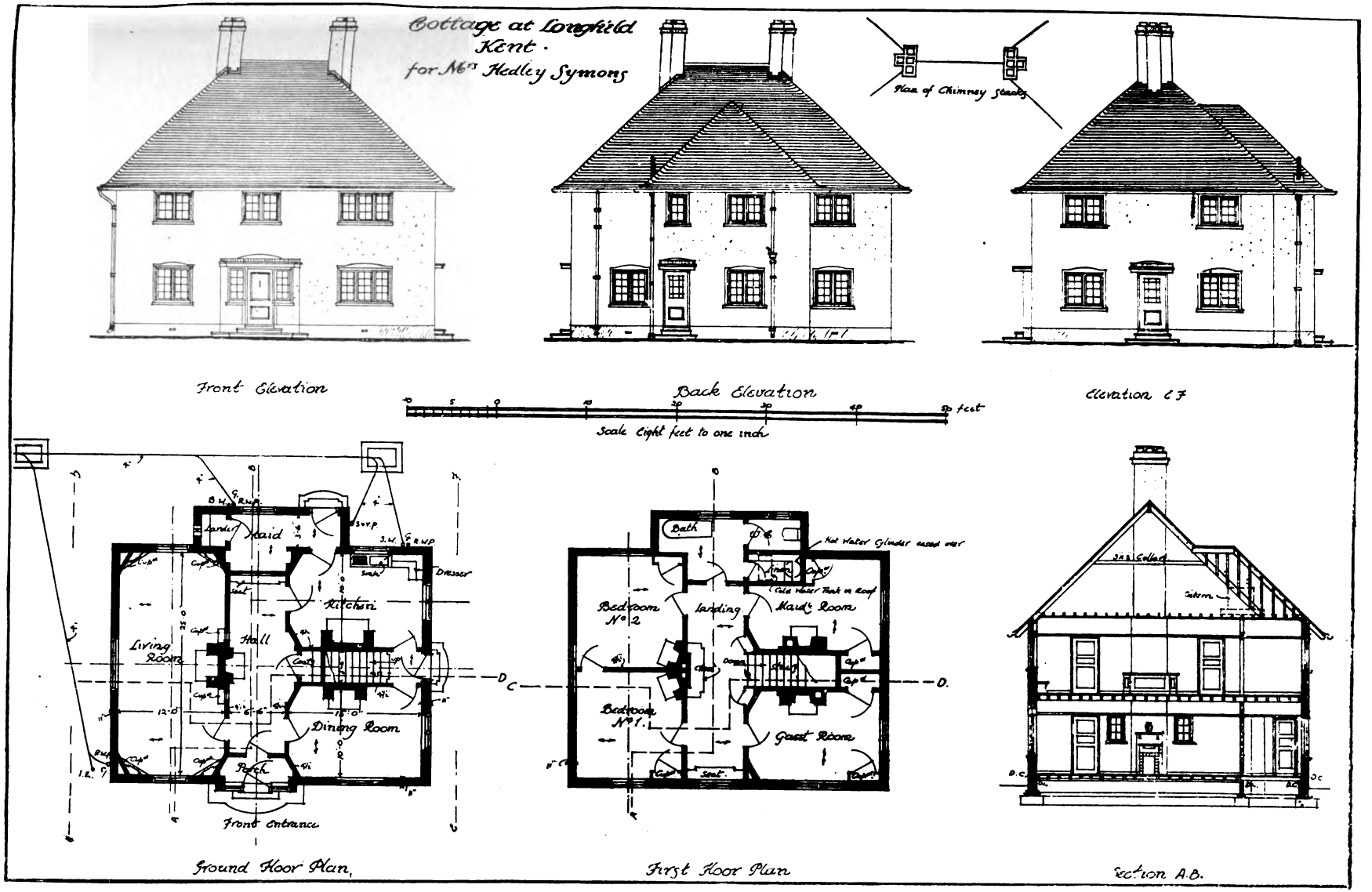

POULTRY FARM-HOUSE, LONGFIELD, KENT.—Mr. SIDNEY K. GREENSLADE, A.R.I.B.A., Architect.

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SLAB DEFLECTION AND SUBSIDENCE OF COLUMN SUPPORTS IN A FLOOR TEST OF INTERNATIONAL HALL, CHICAGO.

(*Continued from page 24.*)

A similar consideration of the mid-displacement z_{23} of the end span 23 shows that—

$$6\,E\,I\,z_{23} = 1/8\,(M_2 + 5\,M_3)L^2 \quad \ldots\ldots(7)$$

The solution of the first four simultaneous linear equations and (7) gives

$$z_{23} = (19\,z_2 - 4\,z_1)/40 \quad \ldots\ldots(8)$$

and by symmetry

$$z_{01} = (19\,z_1 - 4\,z_2)/40 \quad \ldots\ldots(9)$$

Hence

$$z_{01} + z_{12} + z_{23} = z_1 + z_2 \quad \ldots\ldots(10)$$

which is a fundamental equation of displacements in this case of no loads.

In case the assumption were that the walls are simple supports and exert no restraint, the values of the displacements at mid-span have been found to be

$$\left.\begin{aligned} z_{12} &= 23\,(z_1 + z_2)/40 \\ z_{23} &= (29\,z_2 - 6\,z_1)/40 \\ z_{01} &= (29\,z_1 - 6z_2)/40 \end{aligned}\right\} \quad \ldots\ldots(11)$$

from which it appears that this would make the displacement at mid-span of the middle span a little less and at mid-span of the end spans a little greater than when the ends are fixed, and the same kind of effect, but of smaller amount, will be produced by any relaxation of fixity at the walls.

It will be noticed from (11) that

$$z_{12} = z_{01} + z_{23}$$

It is evident that the floor under consideration may be taken to consist of beam strips not only crosswise from side wall to side wall, as has just been done, but also as made up of beam strips parallel to the side walls and extending lengthwise of the building, and that the agreement of the results of computations by these two methods will tend to establish their correctness. Suppose the beam strips to each have a width of ½L extending over the two rows of columns parallel to the long side walls, with a strip of the same width lying between these two. If the length of these strips be taken as 4L, they may be assumed to have their ends practically fixed horizontally, with certain observed vertical displacements at the three intervening columns. The problem in this case is this: Given the vertical displacements z_1, z_2, and z_3 at points of support 1, 2, and 3 of a beam fixed horizontally at the ends 0 and 4, to find the vertical displacements z_{01}, z_{12}, z_{23}, and z_{34}, at mid-span between each pair of supports. The equations are like those already used in the case of three spans, and the values arrived at in the same manner are:

$$\left.\begin{aligned} z_{01} &= (106z_1 - 21z_2 + 6z_3)/224 \\ z_{12} &= (142z_1 + 133z_2 - 30z_3)/224 \\ z_{23} &= (142z_3 + 133z_2 - 30z_1)/224 \\ z_{34} &= (106z_3 - 21z_2 + 6z_1)/224 \end{aligned}\right\} \quad \ldots\ldots(12)$$

It will be noticed that in this case

$$z_{01} + z_{12} + z_{23} + z_{34} = z_1 + z_2 + z_3 \ldots\ldots(13)$$

which is an equation of deflections for four spans similar to (10) for three spans.

On Fig. 1, which shows a plan of the panels of the test, are inscribed, at columns 1 to 6, the amounts of the vertical displacements observed under the final load in inches, and at mid-span between these columns the vertical displacements, computed according to the foregoing equations, that would take place in a uniform slab by reason of the displacements at the columns without applying any load to the slab except the reactions at the columns which are necessary to produce the displacements at the columns.

Displacements at panel centres are also given. These last are computed both by taking beam strips crosswise and lengthwise of the floor midway between the beam strips already computed across the tops of the columns. Practically the same values at panel centres are obtained from the computation by strips crosswise as lengthwise. This affords a satisfactory check on the work. Were the slab of uniform moment of inertia throughout, the displacements which have been computed at mid-spans and panel centres would express the position of the surface from which true deflections should be measured, or the surface of zero deflection from which deflections due to the load or lack of recovery are to be measured. That, however, is not entirely correct for a floor slab, by reason of the great relative stiffness and extent of the column heads, which must be allowed for. The side belts are weaker near mid-span than elsewhere. The kind of effect that this produces may be made evident by considering what would be the effect of joints at mid-span of the beam strips across the floor. That would cause angles in the strips at each mid-span with comparatively straight portions over the columns. At mid-span in the centre of the strip the displacement would evidently be increased by such joints or by any weakness of this kind. In the case of the test under consideration, it is estimated that the combination of a central conduit in each panel tier parallel to the long side walls, with the lack of columns integral with the slab above it, added not less than 25 per cent. to the computed vertical displacements at the centres of panels A and B and midway between those points, these being the points of maximum deflection at which the percentage of recovery is to be determined.

TABLE OF VERTICAL DISPLACEMENTS AND DEFLECTIONS IN INCHES.

—	1	2	3	4	5	6	7	8
At centre	Computed for uniform slab.	Increased 25 per cent. not uniform.	Maximum observed displacement.	Minimum observed displacement.	Maximum deflection column 3 less column 2.	Minimum deflection column 4 less column 2.	Percentage of residual deflection.	Percentage of recovery.
Panel A	0.13	0.16	1.04	0.38	0.88	0.22	25	75
Span 2—5	.21	.25	.95	.37	.70	.12	17	85
Panel B	.22	.264	.98	.38	.716	.116	16	84
Mean	0.19	0·225	0.99	0.38	0.765	0.152	19.3	80.7

The accompanying table gives in column 1 the computed vertical displacements at these points, and in column 2 these amounts increased by 25 per cent., to take account of the increased displacement by reason of lack of uniformity in the slab. Column 3 gives the observed displacements under maximum load, and column 4 the observed displacement after removal of the load and recovery. Column 5 is the difference between column 3 and column 2, or the deflection under the load. Column 6 is the difference between column 4 and column 2, or the deflection after removal of load and recovery. Column 7 is the ratio of column 6 to column 5, or the percentage which the residual deflection is of the maximum. Column 8 is 100 per cent. less the per cent. in column 7, or the percentage of recovery, which has a mean value of 80.7.

The application of a rule requiring a recovery of 80 per cent. in this case, however, discriminates against the floor structure and attempts to have it make good the shortcomings of the faulty foundations on which the columns rest. At the time of the maximum load, when subsidence of the columns took place, the columns were subjected to a very considerable bending moment by reason of the tipping of the floor, which was integral with the column heads. This caused the foundation of each column not only to sink vertically, but to tilt at the same time in an inelastic displacement. On removal of the load, any restoration of the foundation either to its original vertical position or level would have to be accomplished, not by any elastic effort of the foundation itself, but by an elastic effort coming from the floor itself. Not only was work required to displace the foundation at first, but additional work will be required after the removal of the load to right the foundation, or else the foundation will itself tend to restrain the slab and hold it in its displaced position not merely by reason of its vertical displacement, but by reason of its tilted position in addition to that. Thus it is that the displaced foundations tend to prevent the recovery of the slab in other ways than merely by the vertical displacements which have been considered in the preceding computations.

Our Illustrations.

"BLACKFRIARS HOUSE," NOW IN COURSE OF ERECTION NEAR THE SITE OF BRIDEWELL PALACE, BLACKFRIARS, E.C.

This double page is reproduced from the architect's drawing exhibited at the Royal Academy last summer, and the building which it illustrates is still in progress for Messrs. Spicer Bros., Ltd. Mr. Francis W. Troup, F.R.I.B.A., is the architect. "Blackfriars House" stands near the site of the famous Tudor Palace of Bridewell, erected by Henry VIII. for the entertainment of Royal guests from abroad. The building, never really finished completely, was given by Edward VI. to the Corporation and citizens of London, to be used as a house of correction and a workhouse. Dr. Levett, a great friend of Dr. Johnson, was laid to rest in the burial ground of the hospital hard by, in 1782. All the human remains from this cemetery, south of St. Bride's, Fleet Street, were taken to Ilford in 1892. Since then the whole of this area has been much altered. This new building provides the maximum amount of lighting space for all its many floors, while the design preserves very cleverly an architectural character with boldly treated divisional piers, which give it dignity and satisfactory effect. The ferro-concrete floors and roof construction, as well as the staircases, and strong room, were carried out by Stuart's Granolithic Co., Ltd. Mr. F. G. Minter, of Putney, is the builder.

ST. JOHN'S COLLEGE, CAMBRIDGE.

This drawing shows an interesting and unusual combination of collegiate buildings in varied styles and differing dates. Along the river Cam the older parts of St. John's stand on the east bank of the stream, and the confines of the College are bounded by the High Street, with Trinity College adjoining on the south. The foundation derived its name from the ancient Hospital of St. John, and the buildings cover the site of that historic institution. An excellent idea of the extent of the College as then intended is furnished by the celebrated isometric view known as "Loggin's print," which includes the three quadrangles set one behind the other, beyond them being the fish ponds and tennis courts over by the river to the west. The gardens lay on the north, leading to the open meadows past the bowling-green. Trinity and St. John's Colleges set side by side were originally so similar that they were attributed to the same architect. Both had the same foundress and visitor. St. John's was commenced early in 1510 and the Bishop of Rochester opened the first part, so far as then ready, in 1516, but the entire court could not have been completed till 1517. The Countess of Shrewsbury provided the second court during the mastership of Richard Clayton, which extended from 1595 to 1612. The undertakers who had the job given them to do were a couple of builders named Ralph Symons of Westminster, and Gilbert Wigge of Cambridge. These tradesmen made the plans, or "plotts," as well as the elevations or "uprights" upon which their contracts to erect the buildings were based. Wigge had to follow the character of the first court as his contract stipulates, but he introduced several innovations. A portrait of Gilbert

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Wigge is to be seen at Emmanuel College, Cambridge, inscribed by a title designating him as "the most skilful architect of his age." When he signed the plans which he made for St. John's College he did not, however, claim the name of architect.

The buildings are of exceptional local architectural interest, because the early Renaissance style, to which they belong, is so meagrely represented in the University of Cambridge. Wigge and Symons undertook to finish their work by 1602, and the agreed contract price stood at £3,400, with a proviso that the materials of the old buildings should be thrown in "to mend the bargain." Besides, there were additional buildings to be undertaken at a cost of £205. The north wing of the court, furnishing rooms for the college master, was done first, and that part was got ready by 1599, but unexpected troubles arose, and, Symons having died, Wigge got into difficulties, and at last was put into prison. The college work designed by Wigge was disparaged, and his critics said it was "a slight crazy building, which can never live up to the age of the first court, though that court be older by almost 100 years." Lady Margaret, the foundress, grew slack in her payments, being embarrassed and in an impecunious state, and the college was left to find some way of meeting this deficit. The countess still continued in 1620 badly in arrears, and small hopes remained as to her ultimate ability to pay, owing to the disorder of her affairs. Robert Booth, the senior Bursar and Fellow of the college, rose to the occasion and enabled the authorities to carry on and complete that which she had begun. A facsimile of the façade, or "upright," of this building as intended for the centre-piece of the quadrangle is given to a good scale duly set out and signed by both Symons and Wigge, in Willis and Clark's "Architectural History of the University of Cambridge," vol. 2 (published in 1886), together with a full account, setting out in detail much relevant as well as historic information and building sizes. The court measures 137 ft. from north to south, and 165 ft. from east to west. The hall is on the eastern side, and the remainder of the buildings, generally speaking, has been arranged for the purposes of chambers.

The ground floor rooms are 10 ft. high, and those on the first floor measure 11 ft. The garrets or upper floors are from 8 to 9 ft. tall. In this quad the doorways and windows are more or less nearly copied from those of the first court, but a series of picturesque gables replace the intended embattled parapet which was clearly delineated in Loggan's bird's-eye perspective. The library was subsequently turned into chambers, or, as described by a contemporary note, "cantoned out into tenements," in 1616. The building stone came from Barrington, and was used for the foundations. Grimball is recorded as the freemason on the job. The elaborate bay window at the end of the library is dated 1624, and can be seen in our illustration at the end of the buildings overlooking the Cam, to the right over the new bridge, at the rear side of the third quadrangle, which was added about that time. The foundation-stone of the adjacent premises figures in "The Commemoration Book" as being laid in 1669, their style being an excellent specimen of Sir Christopher Wren's period, introduced, however, without the smallest pretence at harmony with the previous work, though quite suitable for the purpose and attractive in character. The William and Mary stone bridge and tall, handsome gate piers adioining were finished about 1712. From this Classic bridge the accompanying view was taken, and to the left of the picture, looking along the Cam, may just be seen the new buildings of 1825-1830, which were carried out in "Perpendicular Gothic" by Thomas Rickman. H. Hutchinson was, however, the joint architect with T. Rickman for St. John's College, and he it was who personally designed the richly-treated bridge connecting their joint new work with the earlier collegiate buildings already described. The cost of Rickman and Hutchinson's "Court" worked out to close upon £78.000. The erection of a new chapel seems to have been contemplated so far back as 1687, when Robert Grumbold made a "ground plott model of ye old and new designed chappell," but not till 1861 was any decided step taken. Sir Gilbert Scott, R.A., was then employed, and his original scheme was estimated, according to his report, to cost from £4,500 to £5,000. Ultimately the job cost £57,955, and as Sir Gilbert enlarged the hall and made other incidental changes, the work's final total reached £85,870, including stained glass and fittings to the chapel, which was consecrated on May 12, 1869, the old chapel having been pulled down to make room for that carried out by Sir Gilbert Scott.

A BALL-ROOM SCHEME.

This dashingly executed water-colour recently exhibited in the galleries of the Royal Society of British Artists in Suffolk Street, Pall Mall, by Mr. H. Butler, of Barnes, shows a new ball-room intended to be panelled in oak, with bold heavy projecting mouldings, the panels to be of slightly lighter colour than the wainscot framing in the walls. The Corinthian capitals and bases of the pilasters to have enriched mouldings in character with the carved foliations and florid cornice, which is to be gilded. The same treatment will apply to the Ionic columned gallery under which is the recessed fireplace. The ceiling under this gallery also will be gilt. The carved and modelled plaster ceiling to the room is intended to have a painted finish of a warm yellow tone near the top of the panelling, graded by lighter tintings towards the middle of the ceiling. Family portraits will occupy positions as shown. The floor is planned to have deep-coloured rich oak parquetry stained under the direction of the designer, and wax polished. Antique Persian rugs, when the ball-room is used as a hall, will give colour to the interior with appropriate furniture in scale with the decorations. The curtains to be of Italian damask in black and gold.

SCOTTISH—ANTIQUE TRADE DEACONS' CHAIR, TRINITY HALL, ABERDEEN.

We complete to-day our series of this 17th century oak furniture belonging to the Incorporated Trades' Society of Aberdeen. The previous sketches which we have been enabled to give by the courtesy of Messrs. J. B. Nicol and R. W. Gibbon, will be found in our issues for October 11 and 18 last. In the earlier number an extract from the old inventory was given, and several particulars appeared about the chairs and tables preserved in Trinity Hall under the care of the above-named body of citizens. In each of the four instances, illustrated by the accompanying double-page, full dimensions and detailed sizes are figured.

POULTRY FARM HOUSE, LONGFIELD, KENT.

The two plans of this cottage clearly show the compactness of its contrivance. The staircase is situated near the side entrance, so that on returning from work on the farm, on occasions, boots may be left and a wash-up obtained before entering the main part of the house. The living room is a good, spacious apartment, and the central hall is roomy and conveniently arranged. There are four bedrooms, a capital bathroom and linen closet. The section explains the heights and the elevations, the effect of the rough-casted walls and high-pitched tiled roofs. The planning of the chimneys is ingenious and gives balance in a simple way. Mr. Sidney K. Greenslade, A.R.I.B.A., of Gray's Inn Square, is the architect. The cost has been about £600.

NEW PREMISES, MESSRS. JOHN REEKS, LTD., GUILDFORD.

Building operations at the above have, for the time being, been stopped by the order of the Ministry of Munitions. The new building is to take the place of a very ancient structure destroyed last year by fire. The buildings about to be erected comprise extensive showrooms on the ground floor, with stock rooms in the basement and a dwelling house over. Externally, the building will be of half-timbered work fixed in with brick nogging; the various floors overhang, and it is hoped that the building, when finished, will accord with the general appearance of the High Street. The oak half-timbered work is being cut out of the old oak beams which were saved from the fire, and will be left untouched from the tool. The brick nogging and chimney stacks will consist of 2-in. bricks, also saved from the ancient buildings. The roof will be covered with hand-made sand-faced tiles of varied tints, to accord with the rest of the work. But for the unfortunate order of the Ministry of Munitions, this building would have by this time been well on its way towards completion. The architect is Mr. Leonard Martin, F.R.I.B.A., of 17, Seymour House, Waterloo Place, Pall Mall, S.W.

HOLDING POWER OF NAILS.

Some very interesting tests of the holding power of nails have been made at the Government Arsenal at Watertown, Mass., and the results may be briefly summarised as follows:—

The tests were made in pine and spruce, with both cut and wire nails. The nails were of all sizes, from 1½ ins. to 6 ins. in length. In every case the cut nails showed superior holding strength by a large percentage.

In spruce, in nine different sizes of nails, both standard and lightweight, the ratio of tenacity of cut to wire nails was about three to two.

With the finishing nails the ratio was 3.5 to 2. With box nails, 1½ to 4 ins. long, the ratio was three to two. The mean superiority in spruce wood was 61 per cent.

In white pine, cut nails, driven with taper along the grain, showed a superiority of 100 per cent., and with taper across grain of 135 per cent. Also, when the nails were driven in the end of the sticks along the grain, the superiority of cut nails was 100 per cent., or the ratio of cut to wire nails was two to one.

The total of the results showed the ratio of tenacity to be 3.2 to 2 for the harder wood and about 2 to 1 for the softer.

This gives a hint as to where we may use each kind of nail to advantage. For example, in laying a floor, where the travel over it naturally tends to loosen the boards, it will pay to use cut nails. Other instances might be cited, but this one will suffice.

OBITUARY.

Paul Winter Morris, a sculptor of prominence, died in New York City on November 19. Born in the State of Illinois, he early took up the study of architecture, commencing to practise in Tacoma, Wash. An early predilection for the art of sculpture caused him to come to New York, where, after a number of years' work under some of America's best known sculptors, he finally became, in his chosen field, an artist of recognised ability.

Second Lieutenant Ronald Basil Howell, North Staffordshire Regiment, attached Northumberland Fusiliers, who was reported missing after an engagement on the night of October 1-2, 1915, has now been officially posted as presumed killed on that date. Born in 1895, he was the eldest son of Mr. W. Norman Howell, architect, of Reading, and brother of Second Lieutenant N. A. Howell, Shropshire L.I., who fell on December 23 last. Educated at Reading School and St. Lawrence's College, Ramsgate, he entered his father's office to follow the profession of an architect, but secured a commission in the North Staffordshire Regiment in November, 1914. He went to the front in the following May. He took a prominent part in the Boy Scout movement in Reading.

A large model of a Y.M.C.A. munition workers' hut and canteen can be seen in the window of 168, Piccadilly.

The borough surveyor of Chorley, Mr. G. H. Hopkinson, has received instructions to report upon a proposed scheme of improvement of the council chamber.

The East Sussex County Council (Mr. F. J. Wood, county surveyor) have accepted the offer of the Road Board to supply the necessary labour for the improvement of the Newhaven-Seaford road, the work to be carried out by conscientious objectors to military service. The council are in some places employing women on the roads.

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Building Intelligence.

Ballymena.—The *Irish Builder* illustrates a well designed Presbyterian Church just erected at Ballymena. The building shows a free treatment of Gothic, features being made of the large tracery window and the tower. The architect has succeeded in combining economy in construction with ample accommodation. The building contract, which included seating, was satisfactorily carried out by Messrs. Courtney and Co., of Belfast. The architect was Mr. S. J. McFadden, C.E., of Coleraine and Ballymena. The building seats 420.

Belfast.—At the corner of Halliday's Road and New Lodge Road there has been erected a picture-house called the Lyceum. The new building adds to the architectural features of the district, and the work was carried out by Mr. Issaac Copeland, Newington Street, from the designs of the architect, Mr. Charles A. Aickin, 20, Rosemary Street. The building is of brick, stone finished, roofed with asbestos slates, and with a long louvre ventilator along the ridge. There is seating accommodation for about 1,000. Marble columns set off effectively a gracefully designed circular entrance porch, the approach to which is by steps of black and white marble. In the porch the floor is tiled with marble, and the ceiling is dome-shaped. The doorways from the porch lead to a large hall with ceiling heavily panelled with oak beams. Off this hall is a lounge, carried out in old English style, for the accommodation of visitors as a waiting-room.

Norwich.—Dean Beeching appeals for subscriptions to build a new chapel to Norwich Cathedral as a memorial to the Norfolk soldiers and sailors who have perished in the war. The architect of the proposed chapel is Sir Charles Nicholson, F.R.I.B.A., of 2, New Square, Lincoln's Inn. There was such a trefoil chapel on the site when the Cathedral was built, but in the thirteenth century it was pulled down by Bishop Walter Suffield to make way for a Lady Chapel of twice the length. Of this later chapel, which fell down in 1563, there remains only the double arch of the entrance; but at present it is walled up, and admits of no view into any chapel beyond. It is evident from these arches that the Lady Chapel must have been beautiful in itself, but it must also have been incongruous with the rest of the building. and accordingly the Dean and Chapter propose to go behind it for their pattern to its predecessor, the Founder's Chapel of St. Saviour, which can be reproduced in its general features from the corresponding chapels on either side of the apse, which still remain.

COLOURED CONCRETE.

For the production of coloured effects in concrete work the following proportions for a finishing coat are recommended:—

Grey—Carbon black, ½ lb. to one bag of cement.

Brown—Iron oxide, 6¼ lbs. to one bag of cement.

Red—Iron oxide, 7½ lbs. to one bag of cement.

Bright Red—Pompeian red, 6¼ lbs. to one bag of cement.

Buff or Yellow—Yellow ochre, 12 lbs. to 17½ lbs. to one bag of cement.

The colouring material should be mixed dry with the cement, and all these ingredients, including water, must be measured exactly and mixed carefully, as the colour always changes to some extent.

By mixing 5 lbs. of colouring matter with each bag of cement in 1:2 mortar the following colours will result:—

Brown—Roasted iron oxide.

Buff or Yellow—Yellow ochre.

Blue—Ultramarine.

Grey to Dark Slate—Lampblack or carbon black.

The Wharfedale Rural District Council last Friday agreed to the following increases in salaries of their officials:—Surveyor, £20, to £270; surveyor's clerk, £13, to £65; and sanitary inspector, £20, to £90.

LEGAL INTELLIGENCE.

CONTRACT OR ESTIMATE.—Messrs. Rice and Buller, builders' contractors, of College Place, College Green, brought an action at the Bristol Tolzey Court last Friday, before the Recorder, Dr. Blake Odgers, K.C., for the recovery of £651 17s. 11d. from Mr. W. S. Cox, blindmaker, Redcliff, for work and labour done for defendant at shop premises owned by Mr. T. J. Lennard, at 69, Queen's Road. Mr. F. E. Weatherly and Mr. Fred A. Wilshire were for plaintiff (instructed by Messrs. G. T. Cooke and Sons), Mr. J. A. Foote, K.C., and Mr. E. H. C. Wethered (instructed by Messrs. D. Johnstone and Co.) represented defendant. Mr. Weatherly, in opening, explained the action was for the recovery of the balance of account rendered for work done for defendant. The first question was what was the arrangement under which plaintiff did the work he undoubtedly did do for Mr. Cox. The case turned upon the document of January 25, 1915, in which Messrs. Rice and Buller estimated for alterations, extensions, and refitting to the premises at Queen's Road for £830 14s. This was an estimate, not a contract, for T. J. Lennard, and was addressed to Mr. Cox. Mr. Weatherly emphasised that the first words of this estimate were, "for T. J. Lennard," and that the work Mr. Buller did—his partner, Mr. Rice, was now in the Army—for Mr. Cox was not in any sense a sub-contract, but day work done by him as a servant. The names of Messrs. Rice and Buller were even to be printed out of all the plant, added Mr. Weatherly, thus, he submitted, supporting his contention that Mr. Buller was doing the work as a day worker, not as a contractor. Mr. Buller supplied the estimate on the understanding that vacant possession was to be obtained, and that the work was to be begun in January or in February at the latest. It did not begin until March. The bill ultimately sent in was for £1,472, the difference between that figure and the estimate being explained by £195 extras, the rise in the price of materials and the absence of vacant possession. Even if it was held the estimate must be regarded as a contract, he claimed it was broken by the delay and the absence of vacant possession. When the bill was presented defendant might have expressed surprise at the amount, but he did not, until now, raise the point that the contract was for £830. After hearing the evidence of Mr. Buller and his cross-examination, his Honour decided he had heard enough evidence. Mr. Weatherly addressed the Court and reiterated that his clients were acting as servants to Mr. Cox. His Honour held that £834 was the contract price and that the plaintiffs were bound to do the work for that sum. After a conference between counsel, judgment was entered (by consent) for defendant, with costs, in settlement of all claims and counter-claims in the action. The Recorder said he thought that was by far the better course, as it would avoid lengthy arbitration.

A contingent of some sixty men recruited by Mr. J. A. Brodie, the city engineer, from his department and that of the Health Committee, has left Liverpool to join the colours.

At the Rochdale Tribunal last Friday an appellant said he had been searching for a house in Rochdale for six months. He has to come from Manchester to his work every morning and return at night.

The Ateneo Montanes Art Gallery, Santander, was on Sunday last totally destroyed by fire. Among the treasures consumed by the flames were several valuable paintings by Velasquez, Vandyck, Titian, Madrazo, Zurbaran, Murillo, Da Vinci, and other artists.

A proposal to extend the Royal Victoria Infirmary at Newcastle is under consideration. Powers are being sought to obtain an additional two acres of land, forming part of the Castle Leazes, situated at the north-east corner of the present buildings in order to provide additional wards.

The Water and Sewers Committee of the Swansea Corporation has decided that Second-Lieutenant George Rudd Collinson, B.Sc., A.M.Inst.C.E., be appointed acting waterworks engineer and manager for the time being as from January 1, 1917, and that in addition to his present salary as deputy borough engineer a bonus be granted to him of £30 a quarter, payable monthly, in respect of the additional work, and that Mr. Brian L. McMillan, B.Sc., be appointed engineering assistant at a salary of £100 per annum as from January 1, 1917.

Our Office Table.

The number of new dwelling-houses in Manchester certified as fit for human habitation in the year ending October, 1916, is the lowest on record. It amounts to 119, as against 410 in 1915, 782 in 1914, 563 in 1913, 615 in 1912, 964 in 1911, 1,590 in 1910, and 2,344 in 1909. In the ten preceding years the average was over 2,000. Last year's return showed that, divided into districts, 54 new houses were built in Withington and Didsbury, 26 in Cheetham, 22 in Rusholme, 10 in Levenshulme, three in the centre, and one each in Crumpsall, Blackley, Openshaw, and Moss Side. In 11 districts of the city no new houses were built at all. There were 59 new houses built in Moston in 1915, but none last year. Moston, Rusholme, Blackley, and the Withington district have been the chief centres for house-building for the last few years, Withington easily holding the lead with 214 new houses in 1915, 366 in 1914, and 435 in 1915. There was an average of nearly 600 in the preceding five years. The effects of Mr. Lloyd George's finance, absence of labour, high cost of building materials and the erection of special works are given as the reasons—outside the war—for the few houses built.

The National Society of Art Masters, having decided to hold its annual meeting in provincial centres, assembled last week at Nottingham, the home of one of the earliest schools of art in the country. In his presidential address, Mr W. H. Milnes, head master of Coventry School of Art, complained that the Universities had been notorious for their lack of provision of instruction or encouragement of graphic arts, and most of the public schools and older secondary schools were still slaves to the predominance of the literary idea. It was surely time people were taught to see through their eyes. The reason it had not been done long ago was largely due to the fact that so many officials on the administrative side of education reflected the narrow University training of which he had spoken. To build up national life and prosperity after the war two things stood out clear—education and organisation, and both implied co-operation.

The clerk to the Warwickshire and Coventry Joint Committee has addressed a communication to the various authorities in Warwickshire on the subject of shelters for consumptives. He states that the committee, after considering all the circumstances, have arrived at the opinion that the present is not an opportune time for the Joint Committee to launch into a comprehensive scheme of providing shelters for the whole district, which it is thought, would probably involve the appointment of officials for their supervision and management. The committee are of opinion that for the present the various borough councils and urban and rural councils should be approached with a view to their providing all shelters that may be required for tuberculous patients in their respective districts, to erect them, or remove and re-erect them when required, and to house them when not in use, on terms to be arranged. The Coventry city authorities have agreed to accept 5s. per month for each shelter when in use, and Bulkington Council 6s. 6d.

The Liverpool Autumn Exhibition has closed its doors, and the novelty of allowing the public to see it free of charge on Sunday afternoons for the last month has proved an unexpected attraction. On the first Sunday there was an attendance of over a thousand, and on the last of more than 1,200 people. An increased interest has been shown in the Art Union. While in the selection of the prizes it is pleasant to notice that almost invariably the exhibits of local artists have been chosen, making a substantial increase on the ordinary sales, the latter, considering the war calls on all, have been quite encouraging.

The formation of ice in water mains is dependent, according to Mr. William Whitlock Brush, deputy chief engineer of the Department of Water Supply, New York City, on three things: the temperature of water in the main, the velocity of the flow of

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the water, and the pressure. The temperature is seldom below 33° F., consequently the freezing will occur only when the temperature falls below the freezing point 32° F. When the temperature falls, even by less than a tenth of a degree, below this minimum, ice will first form near the inside of the pipe, thus serving as a sort of coating or tube of ice. This is due, of course, to the metal conducting the heat from the water nearest the pipe more rapidly than from that in the centre. As regards the flow, the slower the rate the faster the formation of ice. Fragments or needles of ice clog the pipes, the flow diminishes, and the water rapidly freezes into solid ice. Increasing the velocity of flow is therefore a good means of preventing freezing in mains.

Mr. Louis C. G. Clarke has presented to the Department of Metal Work at the Victoria and Albert Museum a blue-and-white Chinese porcelain biberon, mounted in silver as a ewer, of the early part of the reign of the Emperor Wan Li (A.D. 1573-1619), painted in the characteristic greyish blue of the period. The mounts include a curved handle engraved with arabesque foliage, domed lid, foot cast with ornament from a repeating stamp, and a straight spout ending in a wolf's head. The ewer is exhibited in the case devoted to recent acquisitions at present placed in Room 24. Another gift is a group of Sheffield plate and two or three little pieces of silver from Mr. R. F. Norton, K.C. The Sheffield plate dates from the first twenty years or so of the nineteenth century. An oval épergne, dating from about 1800, on four claw feet, with curved branches and heavily cut and moulded glass dishes, forms an interesting link between the earlier and later styles. A little sugar basket is balanced by a cruet-stand in pierced silver, of the year 1772. This group of objects is at present exhibited in Room 22.

An artificial-stone material, patented by K. Ogawa, 29, Matsubaradori Nichome, Kobe, Tokyo, composed of incompletely burnt dolomite, mixed with magnesium chloride solution, and cork or sawdust, with a surface layer of similar material in which the filler is asbestos or slagwool. Finely powdered dolomite is heated to 700-800° C. when the magnesium carbonate is reduced to oxide but the calcium carbonate is left unchanged. To make decorative tiles, 100 parts by weight of burnt dolomite are mixed with 15-25 parts of cork or sawdust and 50 parts of magnesium chloride solution of 18° Bé. This is moulded and then coated with a layer consisting of 100 parts by weight of burnt dolomite, a suitable quantity of slagwool or asbestos, 5-10 parts of pigments, and 35 parts of magnesium chloride solution of 18° Bé. The composition may also be used for making pavements or for covering floors, walls, ceilings, etc.

At the last meeting of the Birmingham City Council the Chairman of the Public Works Committee suggested that "it would be a good thing" to have control over the style of architecture adopted in our principal streets. "If his suggestion was carried out," writes Mr. Sam. N. Cooke to the *Birmingham Daily Post*, "I feel sure it would have the hearty support of the Birmingham architects. At the present time anyone can acquire a site in our most important streets and erect a building which is an architectural monstrosity provided it complies with the city by-laws with regard to stability and sanitation. Such conditions should not exist, and I submit a solution of this problem is not difficult. Two or not more than three architects of repute (I suggest their names should be submitted by the Birmingham Architectural Association) would advise the Public Works Committee of the architectural merits of any building to be erected in any of our important streets and have the necessary powers to disapprove or amend any design that was not suitable to its surroundings or of sufficient architectural merit. If this suggestion was carried out I feel sure it would be appreciated by the public generally, who at the present time are proud of their city but not its architecture."

Commenting on this, a Birmingham architect, who was interviewed by the *Daily Post*, said: "The remark by the chairman of the Public Works Committee, I understand, had relation to the Post Office extension. The main building is supposed to be French in design, of the Second Empire period, and the extension is—well, there it is! This brings us to the old difficulty of architecture designed by a State Department—that is, buildings constructed usually with little regard to their front elevation, but always with an eye to the needs of the people who do business in them. In a lesser degree you have the same thing in public buildings designed by corporation officials for a particular purpose. On the top of all you have to face the fact that you can do nothing till leases fall in, so that in the absence of bold schemes which cannot, of course, be entertained at present, the difficulties in the way of reform are many and great. Still, something can be done. What do I suggest? Well, you want either an Act of Parliament or an alteration in the building by-laws to give the corporation the right to veto plans submitted if they do not conform to a general scheme to be worked to. I quite admit a corporation committee would not be the best authority on architectural æsthetics, and so I suggest they should have at their back an advisory body drawn from members of the Birmingham Architects' Association. This body would be concerned with the front elevation and the erection of building on lines that would harmonise with a general plan to be worked to. This would be a slow method, but eventually you would get uniformity, and the buildings in thoroughfares would possess distinctive features."

The Department of Prints and Drawings of the British Museum has received numerous additions to the collections during the past year. The acquisitions cover all branches and periods, and there are some very fine woodcuts of the fourteenth century, including a very rare set, probably Dutch, showing a group of soldiers. In the same collection is a rare set of cuts depicting the lance of St. Maurice and other relics of the Roman Empire, formerly at Nuremburg, and now in the Schatzkammer, Vienna. There is a lithograph proof, after Lawrence, of Grevedon's "Duchess de Berry," over two dozen works of the American artist, Bolton Brown, colour cartoons on war subjects from the "Nieuwe Amsterdammer," and specimens from the studios of C. H. Shannon, A. S. Hartrick, Mrs Hartrick, and Anthony Barker. From the foreign schools there is a set of five rare etchings of the Seven Sages of Greece by De Gheyn, the younger, two by the Belgian artist Jules de Bruycker, entitled "Kultur" and the "Death Knell in Flanders."

The death is announced of Mr. Joseph F. O'Connor, who had been for many years town surveyor of Ennis and a former assistant county surveyor.

The Lord Mayor will open on Monday, January 15, the hostel established by the Young Men's Christian Association in the old headquarters of the Pearl Assurance Company, London Bridge.

Mr. Sidney Arthur Parnwell, Fellow of the Surveyors' Institution, has been appointed secretary and comptroller to the Great Eastern Railway, in succession to Mr. P. Lomas, deceased. Mr. Parnwell, who is well known in the rating world, will continue to carry out the duties of land agent to the company.

The annual meeting of the Bristol Master Builders' Association was held on Thursday last, when Mr. Frank N. Cowlin was elected president. A cordial vote of thanks was passed to the retiring president, Mr. F. A. R. Woodward, who had held the office for the record period of three years in succession, during which he worked unceasingly to promote the general interests and well-being of the building industry.

As a result of blasting operations on Halkyn Mountains last Friday morning some three miles from Holywell, the water that fed the well of St. Winifred has been diverted and now courses along a fresh channel, leaving the well dry. The flow, normally over 2,000 gallons per minute, has continued for untold ages, and was one of the wonders of Wales. The well is covered by a fine Gothic building, said to have been erected by Margaret Countess of Richmond, and mother of Henry VII., with some portions of earlier date. The chapel (restored) is used for public services.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C., and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

*****Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.**

Telephone: Gerrard 1291.

Telegrams: "Timeserver, Estrand, London."

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ARGUS.—Yes.

PRINCIPAL.—Quite right.

DOUBTFUL.—They are quite trustworthy.

L.R.I.B.A.—We really do not see the suggested analogy.

A housing scheme, to cost nearly £20,000, is to be carried out at Nuneaton.

A memorial brass is to be erected in the Municipal Technical Institute, Belfast, to commemorate the heroism of W. F. McFadzean, V.C., a former pupil of the Trade Preparatory School of the Institute, who lost his life by throwing himself on a bomb thereby saving the lives of his comrades.

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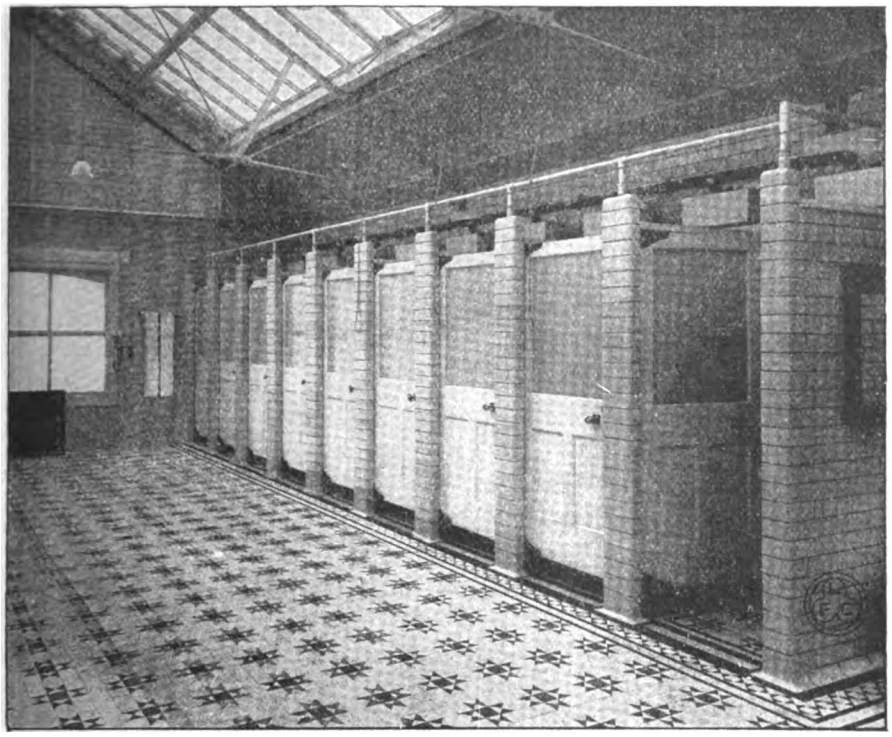

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London Offices and Showrooms—
2 & 3, NORFOLK STREET, STRAND, W.C.

FOR DIVISIONS in
Workmen's Conveniences,
In Munition Works,
Hospitals, Schools, &c.

"SHEPWOOD"
PATENT
Glazed Partition Bricks
(2½ IN. ON BED).

Estimates on application to
The Leeds Fireclay Co., Ltd.,
WORTLEY, LEEDS.

CATALOGUES ON APPLICATION.

C. C. DUNKERLEY & CO., LTD.
One of the Largest Stocks in the kingdom of
ROLLED STEEL JOISTS
Every Leading Section ranging from 24" × 7½" to 3" × 1½".
CHANNELS, FLITCHES, PLATES, TEES, ANGLES, &c.
Compound Girders and Stancheons Riveted Up with despatch from Stock Materials.

Telegrams: AJAX, MANCHESTER. Telephones, 6490—5, six lines

Offices and Warehouses: STORE STREET, MANCHESTER.

VAL DE TRAVERS ASPHALTE PAVING CO. LTD.
MASTIC ASPHALTE.
The best Material for Vertical Rendering to Walls, Dampcourses, Flat Roofs, Basements, Paving, etc.
Telegraphic Address: "TRAVERSABLE, AVE, LONDON." Telephone Number LONDON WALL, 7467.
HAMILTON HOUSE, BISHOPSGATE, LONDON, E.C.

ROLLING SHUTTERS
OF EVERY DESCRIPTION; ALSO INSIDE BLINDS, SPRING SHOP BLINDS, BRASS GUN AND WHITE METAL SHOP FRONTS, GLASS FACIAS, GILT LETTERS, &c.
Estimates Free on application to
S. W. FRANCIS & CO., LTD.,
46-70, GRAY'S INN ROAD, LONDON.
Telegraphic Add.: "Fenestra, Holborn, London." 'Phone: Holborn 160. Established over 60 years.

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"POILITE" and "DECOLITE."

"POILITE" ASBESTOS-BUILDING TRADE MARK Poilite -CEMENT ROOFING TILES. SHEETS.

Over 130,000,000 Square Feet have been supplied to the British Government for Army Hutments, Hospitals, Munition Factories, &c.,

and bears out in a remarkable manner the favourable opinions expressed regarding "POILITE" at the last Annual Meeting of the Architectural Association.

"DECOLITE" COMPOSITION FLOORING

GOLD MEDAL FRANCO-BRITISH EXHIBITION, 1908.

MANUFACTURED AND LAID EXCLUSIVELY BY BRITISH LABOUR, FOR

HOSPITALS, WORKS, OFFICES, SCHOOLS, ETC.

HYGIENIC, Tough and Hard Wearing. WARM and Elastic to the Tread. Fire-Resisting, Vermin Proof. Damp Proof.

For New Buildings, also **for Overlaying existing** *Wooden, Stone, Cement, etc.* **Floors. Quickly Laid.**

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BELL'S UNITED ASBESTOS CO., Ltd.,

SOUTHWARK STREET, LONDON.

BRITISH THROUGHOUT

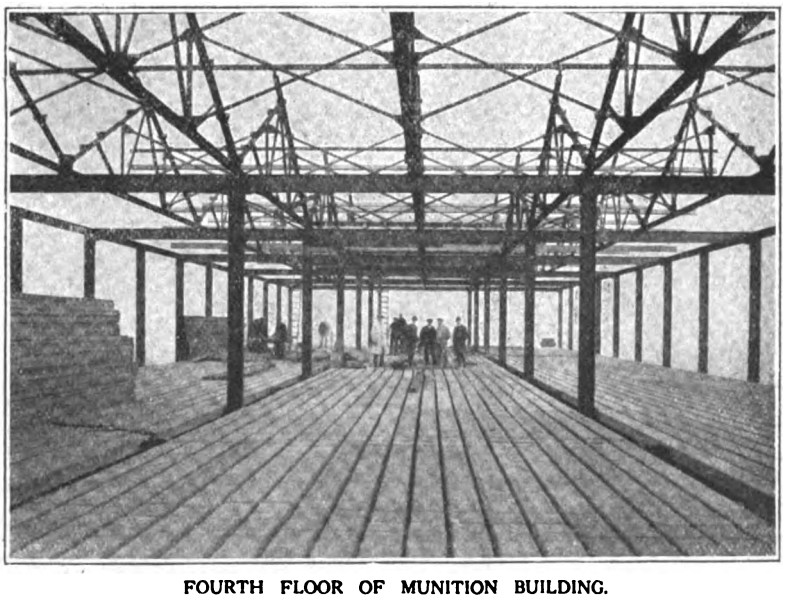
SIEGWART FLOORS

FOR

SPEEDY ERECTION

FIREPROOF and PERMANENT

MINIMUM TIMBER



MINIMUM STEELWORK

FOURTH FLOOR OF MUNITION BUILDING.
Siegwart Beams in position ready for grouting together.

Send for particulars to

SIEGWART FIREPROOF FLOOR CO., Ltd.,

Head Office: **231, STRAND, LONDON, W.C.**

Telephone: 4094 Gerrard. Telegrams: "Nocentring, Estrand, London."

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January 17, 1917. Volume CXII.—No. 3237.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House. Strand, W.C.

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OUR ILLUSTRATIONS.

Church of St. Catherine, Neasden, Middlesex. View from South Aisle into Choir, from a photograph by Mr. Richard Moreland. Mr. John S. Ader, F.R.I.B.A., Architect.

The Library and Chapel in the Vicar's Close, Wells Cathedral, Somersetshire. Measured and drawn by Mr. James Macgregor, Architect.

Sports Pavilion, Saughton Public Park, Edinburgh. Mr. J. A. Williamson, A.R.I.B.A., City Architect, Edinburgh

A Suite of Painted Furniture at Windsor Castle, designed and decorated by Lady Kinloch for Her Majesty the Queen.

Currente Calamo.

The monstrous muddle of our building by-laws is an old story, and one upon which we have often dwelt. These wretched regulations are now over forty years old, and have long been obsolete. Based upon the "model" series originally issued by the Local Government Board of that time, for town areas, they have been applied to country and rural districts, to which they are quite unfitted. Taking no account of modern methods or new materials, such as concrete, they shackle the builder at every turn. And they vary greatly in different localities, so that a row of houses on one side of the street may be under a set of regulations which have no force over the way! Mr. Justice Grantham, a few years ago, desiring to build some rural cottages, fought the authorities in the Courts, and gave us all good example. Many, if not most, of these by-laws are legally bad, as being *ultra vires;* but going to law is both a costly and a risky business, and so they are rarely disputed. At the present time small houses and cottages are urgently needed, and this need will be still greater after the war. Of course, no real reform can be expected for years; but, meanwhile, the Government could, under their existing statutory powers grant a wide discretion to all the local councils, or, even better, issue an order from the Local Government Board suspending the most absurd and vexatious of these by-laws for the duration of the war. This could, and should, be done at once, and upon broad lines, under good expert advice, and that would give owners and builders a fair chance of getting on with the work they are now ready and willing to do for the benefit of the whole community.

In a letter to the Trustees and Director of the National Gallery the Council of the Museums Association, a body representing the leading museums and art galleries in the Empire, express their appreciation of that part of the National Gallery Bill, 1916, which proposes to allow loans to Colonial galleries and some extension of the facilities for the loan of pictures and works of art to provincial galleries. With regard to that portion of the Bill providing for the sale of works of art in the possession of the National Gallery Trustees, or which may be acquired by them in the future, the Council ask that, in the event of the Bill becoming law, "the most intimate and sympathetic consideration be given to the needs of the aforesaid provincial and Colonial galleries before any work be sold, seeing that the deficiencies of our provincial collections, in the matter of pictures by deceased masters, are so many that all the National Gallery duplicates of any importance could be absorbed by them with great advantage to the diffusion of art knowledge in our own country." The Council are also of opinion that any legislation designed to restrict the exportation of certain classes of paintings, etc., should apply to all works falling into those classes, and not be restricted to those specified on a list which has been prepared by or for the Trustees of the National Gallery. The considerations urged by the Association are reasonable, but whether they are likely to receive attention at the hands of the Trustees is doubtful, judging by the past proceedings of that body. What is wanted at Trafalgar Square is an administration capable of understanding and meeting obvious home needs, and we trust at an early date we may get it.

Finders of mare's nests seem always able in these days to command space in the *Times*, relying possibly on the ignorance of its conductors of facts. The following letter, which appeared in that journal last Wednesday, is one of the most flagrant:—

Sir,—During the last two years a pseudo-Greek Temple of imposing dimensions has been erected in St. Marylebone for the use of the borough council. It does not appear that any cost has been spared on its external adornment or on its internal fittings. From the time the building was started huge placards have covered the hoardings with which it is surrounded. These proclaimed in letters 2 ft. or more in height:—"To Dress Extravagantly in War-time is Unpatriotic." "Gas and Electricity should Not be Wasted." "Every 15s. 6d. Saved Would Purchase 124 Cartridges." "Don't be Extravagant in Your Expenditure this Christmas." But so far no notice has appeared "To *Build* Extravagantly in War-time is Unpatriotic." Precepts of economy backed by expenditure on such a scale are not likely to prove convincing. Would it not be better—at a time when the country is in urgent need of money—to stick to the old adage, "Example is better than precept"?—I am, Sir, yours, etc., COMMON SENSE.
January 9.

Very "common" sense indeed! Would it not be better for the amateur censors of extravagance to acquaint themselves with the truth before they make themselves ridiculous? The design for the new Marylebone Town Hall was accepted in November, 1911, nearly three years before the war began. Its need had been patent for several years. The Marylebone Borough Council acted throughout, as we said on p. 761 of our issue of December 1, 1911, with the "most business-like fairness and common sense." We illustrated the competition designs in that number, and in our review of the successful design by Mr. Edwin Cooper, F.R.I.B.A., we remarked on the moderate cost of the extremely able and attractive scheme—1s. 2d. per foot cube. In our issue of May 8, 1914, we gave Mr. Cooper's Royal Academy perspective of the building, which should sufficiently satisfy any competent judge as to the character of the design. The contract for the building was made long before the war began, and it is well that was the case, as the Borough of Marylebone has saved thousands of pounds. Its completion and occupation are hindered because the Pensions Committee at present occupy the building.

A useful hint, which we ourselves have more than once emphasised, in connection with the housing problem is given by Dr. R. T. Edwards, the medical officer of health for Merioneth, in his annual report. That there is a scarcity of suitable workmen's dwellings in different parts of the country we all know too well, but till the war is over no new ones will be built, and Dr. Edwards advises all local authorities to resort to the provisions of Section 15 of the Housing and Town Planning Act of 1909, in preference to enforcing the powers conferred upon them by Sections 17 and 18 in regard to the closing of houses which become unfit for human habitation. In this connection he recalls that relative to these powers the Local Government Board says:—"It is satisfactory to note that the number of the authorities who have exercised these powers has increased substantially. In addition to the repairs and improvements effected to dwelling houses by means of formal action under this section, local authorities have secured the execution of a large amount of work for the improvement of houses by means of representation to, or negotiations with, owners, without resorting to formal notices under the Act, and, moreover, the number of notices under the Public Health Act for the removal of

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nuisances is very large. Dr. Edwards also draws the attention of local authorities to the considerable difficulty experienced in obtaining from owners of property sufficient notice of prospective changes in the tenancies of small cottages. Under Section 15 the local councils are empowered to require the owner of any dwelling house to put it into a fit and wholesome condition before a new tenant is allowed to occupy the premises, but owing to the neglect of owners to give notice of impending changes of tenancy, new tenants are allowed to enter into occupation before an opportunity is given for the inspection of the premises, and to state what alterations are required before re-letting.

The dream of the *City Press* fascinates us—born and educated in the City of London, and appreciating thoroughly its excellent sanitation, far in advance of that of most of the modern boroughs that cluster round it, but we fear it is unrealisable. "How different a place would the City be," remarks our contemporary, "were it to become once again the home, and not merely the office and counting-house—a social community, and not merely the centre to which the citizen comes to earn the money which he spends beyond its borders. One initial difficulty stands, of course, in the way. The Inhabited House Duty is an effectual bar to any return. As the law stands, the occupation of a single room residentially renders the entire building liable for duty. Separate assessments may, perhaps, overcome this obstacle in a measure, but a return en masse can only materialise if the law is altered in such a way as to render the occupier responsible merely for the rooms used for residential purposes. Some day we hope to see the Corporation making a move in this direction, and so paving the way for such a revivification of the City. Many a landlord would, we feel sure, welcome such a revolution, and certainly many a citizen, and more especially the heavily rented and rated trader, would readily avail himself of the opportunity offered to retrench financially by 'living in.' Into what ideal flats could such buildings as Salisbury House and River Plate House be converted. What a splendid boulevard could be constituted by the erection of imposing buildings along the Embankment. How cosy as homes would be some of the old world buildings that still remain to us, the efforts of the building fraternity notwithstanding, in the highways and byeways of the City." And may we add how comfortable it would be to adjourn from breakfast to work and from the office to dinner without wasting the couple of hours lost daily in reaching business and returning home.

As was to be expected, the First Commissioner of Works, after taking expert advice, has rejected the fantastic suggestion that the public parks in the centre of London should be ploughed up for the growth of food. The soil is unsuitable, and the soot and dust would make good crops out of the question. An exception is a small part of Kensington Gardens, to be used as a demonstration area to show allotment holders the possibilities of vegetable cultivation. As regards Richmond and Bushey Parks the case is different. They are well removed from the city's smoke. Even there, however, the possibilities are limited. A considerable proportion of both parks is under woodland, and much of it is either marshy or so gravelly as to entail great labour in cultivation. The King's approval to the breaking up of these Crown properties has been given as an example to the private owners of demesne lands more suitable for cultivation. As both Richmond Park and Bushey Park are enclosed, the protection of the growing crops will be comparatively easy.

THE A.A. PUSHES ON.

The Architectural Association, always the most virile of our professional societies, is taking time by the forelock in regard to the requirements of members of the profession returning after the war. It may, of course, be some time before it is necessary to put the scheme in operation, but it is well that all architects, and especially the younger members of the profession, should know that it is under consideration. The Council will welcome suggestions from its own members, but they should be offered promptly, as the arrangements contemplated should be perfected to the smallest detail if they are to be really effective when required.

The Council of the Association, in their brief résumé of the suggestions before them, anticipate, as we all do, that the architectural profession, as soon as peace is made, will benefit by the inevitable desire to push forward as soon as possible the various building schemes which have been suspended or postponed owing to the war. However busy architects may become, it is almost certain they will be handicapped by a shortage of help. During the war the normal annual influx of young assistants to the architectural profession from the schools and by pupilage has ceased entirely, and the number of assistants who have fallen in the war will affect the profession to a marked extent.

Thus, at the end of the war, whilst there will be an accumulation of some years' delayed work to be proceeded with, the number of assistants will be less than it was before the war.

The A.A., therefore, contemplates providing facilities for assistants to be brought into touch with would-be employers; helping the temporarily disabled and unfit, helping those who, as a result of the war, find themselves totally disabled from following the architectural profession further, and assisting to become qualified architects those disabled from following other callings; and providing means for those who desire it to recover such architectural proficiency as they may have lost whilst serving. Each project seems to us a practical one and deserving of all support.

The A.A. has always kept a bureau for unemployed assistants, which has been recognised by practising architects as a centre from which they could obtain assistants. During the war the rule that only members of the A.A. when unemployed could use the bureau has been waived, and it has been opened to the profession generally. It is suggested that this arrangement continue to be in force for such period after the war as may be determined. It is suggested that the scope of the bureau be widened, and that it be given some such title as "The A.A. Employment and Information Bureau for Architects returning from the Army." Its scope should not be limited in any way, but it should be allowed to develop as experience shows to be necessary. As the A.A. War Service Bureau has been, since the commencement of the war, the recognised centre for assisting members of the profession in Army matters, so should the proposed new bureau be available for any architects' assistants seeking advice and assistance on any matter connected with the return to civil life.

As regards the provision of facilities for assistants to be brought into touch with would-be employers, a register of disengaged assistants should be kept, and also a register of architects requiring assistants, arrangements being made, if possible, to work in conjunction with the provincial societies, who would also be able to consult the bureau on behalf of any of their members. Information could be collected as to openings in the colonies and abroad, and assistance given to those compelled to seek another climate on account of broken health.

There will probably be a number of assistants at the end of the war who, for some time, through various disablements and nervous disorders, will not be capable of taking up the full duties of an architect's assistant, but who at the same time would be able to follow a light employment, and who, indeed, would benefit by so doing. To meet such cases, it is suggested that a drawing, tracing, and photo-printing office should be formed, which should undertake all such work as commercial offices of this nature usually undertake. Such an office would undoubtedly, in the first instance, need subsidising, but in a short time it should pay its own expenses, and provide a fair wage to all employed. Profits, if any, could be given to benevolent schemes in connection with the profession. It should be managed on business lines as far as practicable, but its object would be defeated were not a certain amount of latitude allowed to those employed. There is no reason why such an office should not be a permanent institution, as there should be, even in the slackest times in the profession, no difficulty in keeping it supplied with work, and in any time of acute unemployment in the future it would be a very useful means of providing work.

There will be probably very few totally disabled, and thus prevented from following the architectural profession further, coming under this category who will need to consult the bureau, as there are already many institutions in existence for re-training the disabled according to their abilities, but at the same time, as the A.A. has done so much to encourage members of the profession to join the Army, it would seem its duty to be prepared to help any who, through their service in the Army, are compelled to give up the profession for other work. The bureau could collect all information about re-training schemes, so that such information should be ready at hand for anyone in the profession needing it, and the A.A. should use its influence to get the best possible training and help for those consulting it. It should also co-operate, where practicable, with the various training committees in assisting men from other callings who wish to train as qualified architects.

There will also be those who will desire to recover such architectural efficiency as they may have lost while serving, and it is suggested that arrangements be made to help those who wish to be coached up again in professional matters, after three

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or more years' absence from the architectural world. As an educational body, the A.A. could certainly best organise that..

We are sure the scheme will elicit general approval and any necessary aid. It is in every way likely to prove a worthy continuance of the Architectural Association's past activities, which only the misfortunes due to the war and common to most of us have suspended. We wish it the most complete success and the heartiest co-operation of all concerned.

THE ROYAL ACADEMY WINTER EXHIBITION OF GRAPHIC ART.

As already announced, the Royal Academy Winter Exhibition, which will open to-morrow, consists of drawings, etchings, and engravings in the various forms by living artists, and the principal societies for these arts are fully represented. There is also a retrospective section, intended to illustrate the history of engraving and etching from the Fifteenth to the Nineteenth Century, and showing many rare examples of most of the principal masters of line and mezzotint engraving and of etching. The exhibition also includes a number of modelled designs for memorials by leading British sculptors. Representatives of the Senefelder Club, the Society of Graver-Printers in Colour, and the Society of Twelve have collaborated with the Royal Academy Council in the organisation and arrangement of the exhibition. A large number of the drawings, etchings, and engravings by living artists will be for sale, and half of the proceeds of each sale will be given to the Red Cross Society.

There are no less than 1,334 exhibits, many familiar to most of us, but not a few which are seldom seen, and some which are of no great interest. Gallery I. is devoted to drawings, including four by Mr. Alfred Parsons, R.A., eight by Mr. George W. Lambert, six by Mr. F. Derwent Wood, A.R.A., six by Second-Lieutenant Muirhead Bone illustrating scenes at the Western front, eight by Mr. William Rothenstein, four by Mr. George Clausen, R.A., and three by Mr. William Strang, A.R.A. Of architectural interest we note a "Doorway of the Castle of Maniaces, Syracuse" (2), by Mr. F. Hamilton Jackson, R.B.A.; "The Pool, Pershore" (12), by Mr. Reginald Blomfield, R.A.; "Pisano's Pulpit, Siena Cathedral" (52), and "West Porches, Chartres" (53), by Mr. Thomas W. Rooke, R.W.S.; and "The Citadel, Laon, France" (128), and "Metz" (129), by Sir Ernest George, A.R.A.

Gallery II. has more drawings and wood engarvings. Mr. Bernard Gribble sends one of his spirited naval efforts, "Destroyers on the Track of a German Submarine" (136), and a good design for Red Cross stationery, "The Iron Duke" (257). Two of the best things in this room are the "Design from Julius Cæsar" (154) and "Sketch of a Bloodhound" (186), by Mr. Briton Riviere. Among others, Sir Edward J. Poynter, P.R.A., shows a good "Study for Fresco Painting" (192). There are several good things by Mr. Edmund H. New, including "Giotto's Campanile, Florence" (131), "A General View of Florence" (134), and "High Street, Oxford" (135).

Gallery III. is devoted to aquatints, mezzotints, etchings, and dry prints. Here, again, Mr. George Clausen and Mr. William Strang are liberal contributors, and there are some good things by Mr. W. L. Wyllie, R.A., and Sir Charles Holroyd. Mr. A. Wallace Rimington sends "Militarism or Christ" (460).

Gallery IV. is occupied by lithographs by deceased and living artists, and Gallery V. by more lithographs and colour prints.

On the whole the "Retrospective Section," which fills the larger of two South Rooms, is the most interesting feature of the exhibition. It comprises a very fine selection of engravings and etchings, illustrating the history of those arts from the fifteenth to the nineteenth century, and there are some rare examples of most of the principal masters of line and mezzotint and etching, including several by Rembrandt and Albrecht Durer, and a good selection from Turner's "Liber Studiorum," lent by Mr. A. A. Allen, M.P. The smaller South Room is given up to Victorian illustrations. There are several by Mr. Henry Holiday, Whistler, Sir Luke Fildes, Sir E. J. Millais, Frederick Sandys, G. J. Pinwell, Charles Keene, Sir E. J. Poynter, Tenniel, Burne-Jones, D. G. Rosetti, Holman Hunt, and Aubrey Beardsley.

The sculpture is a somewhat varied collection of models and sketches. There is a good bronze statuette of "Victory" (913), by Mr. Alfred Drury, R.A.; a sketch model for an equestrian statue of Edward VII., by Mr. Hamer Thornycroft, R.A.; another of the memorial effigy of the late Marquis of Salisbury in the Salisbury Chapel, Hatfield (918), by Sir W. Goscombe John, R.A.; and Sir Thomas Brock's model for the tomb of Lord Leighton (922). Some appear to have been designed to suit any qualified client, as, for instance, the "Model of a memorial to commemorate some notoriety," by Mr. Charles L. Hartwell, A.R.A.

THE AMERICAN INSTITUTE OF ARCHITECTS.

The fiftieth annual convention of the American Institute of Architects was held at Minneapolis on December 6, 7, and 8 last, and was numerously attended and well conducted. The reports of the various committees were practical, and the hospitality tendered to all present hearty. We give from the report in the *American Architect* the principal points of the opening address by President Mauran.

THE PRESIDENTIAL ADDRESS.

For just half a century the American Institute of Architects has been meeting in annual convention.

Each succeeding year has marked some progress toward the goal of the truly national idea—toward that common understanding which comes alone through unified service in the cause of those ideals which must ever stand just beyond the goal.

In all the broad field of human endeavour the two callings which stand out as being inherently constructive are journalism and architecture. The lawyer's brain, alert and resourceful, is given more to analysis in the daily round of his practice than to that synthetic, constructive thought which contributes to the advancement of mankind.

It is true the surgeon and the physician are devoted searchers for the truth as a foundation on which to rear their manifold contributions for the betterment of humanity, but their activities are proceeding along ever-narrowing lines as the broadening field of research is subdivided for the winnowing. But where stands the successful architect of to-day? Not where he stood at the moment of the holding of the first convention of the American Institute, just half a century ago—or even twenty-five years ago—a cultured gentleman, giving to the world his painstaking solutions of the simple problems of his day and generation. To-day he must still be not only the cultured gentleman, the efficient solver of his clients' problems, but, in the successful practice of our creative art, he must be the astute business man, the master in the broad sense of all the sciences which have contributed to the complexity of the modern building. Moreover, he must ever *lead* always a few laps in advance of the client outlining his requirements, be they the technical ones of the director of a proposed hospital, or the simpler demands of orientation of a private house.

The millennium has not yet come, but I want to try to point out to you the way by which its coming may be advanced by leaps and bounds At this, the fiftieth convention, your officers have wrested from that time-devourer, "unfinished business," one entire afternoon session to be devoted to an effort to formulate a plan for assisting the United States Government in its architectural *impasse*.

Whenever a complicated problem is encountered, the first advice of the architect is to call in an expert—one who has given time to an exhaustive study of similar conditions, but we architects are perhaps naturally disinclined to take our own medicine—annually we give much thoughtful effort to the solution of our officers and board of directors, who in turn select with judicial care the committees of experts to study the manifold complexities of our organic law and our professional activities. But when we meet as delegates to hear the decision of our experts, the very strength which is going to lead us to higher things becomes our weakness through force of habit and the near perspective in which we regard these details. I began by saying that our profession is "inherently constructive," and, with that constructive impulse dominant, we straightway fall to discussing the reports of our experts, suggesting changes and improvements so comprehensive as to embrace the punctuation—and all on a moment's notice we attempt to qualify as experts in as many minutes as our committees have taken days to assimilate the controlling facts.

Heretofore the reports of these, our painstaking labourers in the vineyard, have been handed over to hastily gathered committees for a consideration that, with the best intent, can be but superficial. Now, since your officers and board of directors have had progress reports throughout the year, and are in every way familiar with every detail as well as with the ideals and aspirations of the Institute body, we have decided to review all committee reports in the report of the board of directors. The next step is a long forward move, calculated to maintain the essential feature of democracy in our organisation and to prevent that dangerous tendency toward centralisation of power One full day has been given to the Committee of Delegates, appointed in advance, to digest and thoroughly weigh the subject matter thus presented by your board, and to comment freely thereon in transmitting the same to the delegates. This is an effort to place each matter before you in such a final way that long debate will prove superfluous as precedent to your adoption or rejection. Doesn't that promise an orderly, systematic disposition of minutiæ, which will clear the deck for action that is worthy of the highly constructive thought of the foremost men in our profession?

Two fields of endeavour stretch before us. One might be called the field of "understanding" and the other the field of "service." One must have held a viewpoint revealing every hill and valley in the field of understanding to estimate the "cuts and fills" in the smoothing process that waits for our labour.

A very considerable group in our membership conceives the functions of the Institute to be that of a rate bureau. Their attitude indicates a mental parallel between the Schedule of Proper Minimum Charges and a lever, whereby a prospective client may be coerced into paying an established fee, but with little regard to the character and value of the services the Institute had in mind when it decided that the present minimum was a fair value to put upon full service. Such an attitude engenders neither respect for the Institute nor respect for the architect. Can we not bring an understanding through our discussions which will reveal the truth that the type of service rendered shall bring the desired return in respect, and our pecuniary reward in fees higher than the

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minimum when, and only when, they represent value received?

There are architects who sincerely believe that the national body alone should exist, and that Chapters are unnecessary appendages, while per contra there are insular minds impregnated with the supreme importance of the local group, whose problems they believe purely local, and who see no use in contributing to the maintenance of the national body. If these opposite minds be set to work on our field of "understanding" the first furrow would turn up the first man's concept as an academy which has a mission all its own and which time will surely bring with the growth of the republic, while the second man, as he performs a common labour with his fellows from coast to coast and from the Gulf to Saskatchewan, would grant the truism that the whole is greater than any of its parts—he would discover, as your officers have discovered, that problems are "local" only inasmuch as they occur in every locality, and that the strength which comes from unity of thought and act can only grow in an *American* Institute of Architects, one and indivisible.

How much we have to learn from one another is proven by the experience of your officers in visiting a dozen Chapters, something over a year ago, and how much the visited Chapters learned is attested by the marvellous growth during the last fourteen months of the national idea. My mind is so full of examples of the resultant good and of the constructive work which has thus been set in motion that I dare not start an endless tale of absorbing interest. But the point which all this emphasizes is that sessions of our Convention should be given over to work on our field of "understanding"—and if I dared not trench on your time with the interesting details of the benefits of a common understanding among the members of this national body, I could do scant justice in a day's time to the multitude of crops waiting for the garnering in the field of "service." In this busy world but little time is given to the graphic thought that almost every being that has a roof overhead is directly or indirectly beholden to our profession. Such colossal unfamiliarity in so intimate a field renders less surprising the utter lack of intelligent appreciation by many men in high places—men counted as intellectual citizens of the world. Sometimes a threatened invasion of a park area, or the impending demolition of an historic monument gives us, the self constituted defenders of the faith, an opportunity to demonstrate our latent strength, and, while battling for the public good, to open the eyes of those with whom we come in contact to the hitherto unseen beauties which lie all about us. This is an altruistic service that we do instinctively, and in the doing we earn a new-found respect for our profession. A score of kindred examples of disinterested services might be discussed at our Convention with profit to our fellowship and an advance toward that will o' the wisp, "the appreciation of the public," more rapid than will ever be made through the much-discussed circularsing of the attributes and functions of a highly idealised architect. The public needs our help, but sorely indeed does our national Government stand in need of the application of the architect's trained constructive mind to the many problems of administration as well as in the actual field of architecture. This year we are beginning this unselfish, altruistic campaign to take the vexed question comprehended by the term Government architecture through the initial steps on its way, we hope, toward a brighter future.

I spoke before of journalism as the other constructive calling and that appellation is justified by the admirable work of the able editor of our Journal in this same campaign.

The development of our great asset, the Journal, as a medium for the advancement of our labours for better architects and better architecture, is a congenial task, carrying its own reward through its broad dissemination of those facts which make for a common understanding between our profession and the public. Its work is guided by high ideals and above all its aims are highly constructive.

At the last two conventions my predecessor touched our hearts and stirred our every sympathy with his word-pictures of the tragedy being enacted across the sea. Today the tragedy still holds sway, but we must look beyond that moment of devout Thanksgiving when peace shall have rung the curtain down to the day when war-weary Europe shall confidently demand not our sympathy alone but our sympathetic constructive co-operation. And on that day let us not be found unprepared to take up the responsibilities which belong to us by right and by training as citizens of the world. Alexander McKenzie happily expressed the underlying thought that I have tried to bring home to you in saying, "It is unworthy of us, it is inexpedient and unprofitable, to be so often discussing little quesions of conduct, little matters of casuistry. Cannot we settle these into some grand principle, so that they shall adjust themselves to our life as the waves adjust themselves to the ship that is sailing through them? Sometimes we meet these questions as if they were a swarm of gnats, fighting them one by one, when, if we would only move on, we should leave them behind, and then in the clear, cool air we would do the work which we have determined to do."

QUEBEC ARCHITECTS DEMAND LEGAL QUALIFICATION.

A Bill has been introduced into the Quebec Legislative Council by the Hon. J. L. Perron, which will make it impossible for any person to act as architect without being a member of the Province of Quebec Association of Architects. The association objects to any person calling himself an architect without being a member, and legal action has been several times taken, under the Act constituting the association, against persons alleged to be practising illegally. A recent judgment of the Court of Review, however, proved unfavourable to the contention that persons acting as architects are bound to be members of the association.

The object of the Bill is to remedy the defect, and the measure is also aimed at persons outside the association, including engineers, who design buildings, particularly industrial plants, work which it is claimed is wholly within the architectural sphere. The wording of the Bill is very comprehensive and apparently will prevent contractors from building for proprietors without an architect being consulted. No one who is not a member of the association may act as an architect "directly or indirectly" without incurring penalties named in the Bill, a provision which, on the face of it looks as if it will affect the hundreds of small contractors who build without calling in an architect.

The Bill gives the Council of the Association discretion to admit to its membership all members of associations of architects in the other provinces of Canada, also members of the Royal Institute of British Architects, and of foreign associations of architects of equal standing on their presenting their credentials.

Architects, not members of the associations, who shall have practised for five years, shall be admitted without serving as students, but shall be required to pass the final examinations.

No person shall take or make use of the name or title "architect," either singly or in connection with any other word, name, title or designation, nor act as such, either directly or indirectly, unless he is registered as a member of the association.

It is further provided that anyone who, not being registered as a member of the association, takes or makes use of any such name, title, or designation, or acts as architect either directly or indirectly, shall be liable to a fine not exceeding $25 for the first offence, and not exceeding $100 for every subsequent offence, and, in default of immediate payment of the fine and costs, to imprisonment for not more than ninety days, unless such penalty and costs be sooner paid.

The Holywell Urban Council has appointed a committee with a view to the restoration of the water flow to the famous St. Winefride's Well.

"RECENT PROGRESS IN DREDGING MACHINERY."*

By WILLIAM BROWN, M.Inst.C.E.

The paper deals with bucket dredgers, suction dredgers of the "cutter," "drag," and "moored" types, and dipper dredgers. Each of these types within its limits is recognised as being best suited for particular classes and conditions of dredging, and the vessels described in the paper have not been selected because of any phenomenal dredging done by them, but because special attention has been devoted to their design to meet the several conditions of their intended use.

With regard to the question of dredging costs, no fair comparisons can be made unless due regard is had to all the items—labour, coal, oil, and stores—and to the physical conditions met with. Comparisons are only of value when the conditions are fully explained, when all corresponding details are included in the charges, and when the methods of accounting at the various ports are reduced to common terms.

BUCKET DREDGERS.

The bucket hopper dredger "Silurus" is taken to represent the most modern dredger of the bucket type, and particulars are given of the work done by the dredgers "Corozal," "Kuphus," and "Octopus."

The "Silurus" is a twin-screw bucket hopper dredger built of steel to Lloyds' requirements for the port of Bombay.

Length between perpendiculars ...	260 ft.
Breadth moulded	46 ft.
Depth moulded	20 ft.

The hopper has a capacity of 1,500 tons. The steam generating plant consists of two marine cylindrical multitubular boilers, and there are two main engines of compound surface-condensing type for propelling the vessel, or for driving the dredging gear as required. The gearing between the main engines and the upper tumbler is so arranged that with a constant piston-speed of the main engines two different speeds of buckets can be obtained. Two sizes of buckets are provided, one set of 42 cubic ft. capacity for excavation in soft material, and a smaller set each of 22 cubic ft. capacity.

CLAY-CUTTING SUCTION RECLAMATION DREDGERS.

These dredgers give satisfactory results in all classes of clay, as well as in free material, and on occasion cutter-dredgers have been employed on stiff blue clay and on hard chalk, which have been found a severe test of the capabilities of powerful bucket dredgers. The cost of repairs and renewals in cutter dredgers when working in hard material is less than with bucket dredgers, owing to their wearing parts being much fewer, the only parts of importance subject to hard wear being the cutter blades and liner plates of the pump, as against the buckets, pins and bushes, tumblers, and ladder-rollers of a bucket dredger.

The clay-cutting suction dredgers, "Jinga" and "Kalu," which are described, were ordered by the Bombay Port Trust for carrying out a very large reclamation scheme undertaken by them.

These vessels were designed to be capable of dredging 2,000 cubic yards of soft clay and mud per hour from a depth of 30 ft., and discharging the material so dredged to a distance of 4,500 lineal feet on shore. The dredging depth was subsequently increased to 40 ft. Their dimensions are:—

Length on main deck	205 ft.
Breadth moulded	42 ft.
Depth	13 ft.

The dredging pump is driven by a set of triple-expansion, inverted, direct-acting surface-condensing engines. The boilers are four in number, of the cylindrical multitubular type, and provided with Howden forced draught. The cutter is of rotary pattern.

In the Twante Canal, connecting Twantewa with Rangoon, suction cutter-dredgers were

* Abstract of a paper read at the ordinary meeting of the Institution of Civil Engineers on Tuesday, January 9, 1917.

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employed to cut the clay that formed the bank and bed of the canal and pump it through a floating pipe-line to alongside of wherever it was desirable to deposit it upon the bank, and then raise and discharge it by means of a floating terminal pontoon with a raised pipe overhanging the bank.

Three suction cutter-dredgers, each with 1,000 ft. of floating pipe-line and a terminal pontoon with 80 ft. overhang, were ordered by the Indian Government. The "Oswald" and "Campbell," the two smaller boats, both have 24-in. diameter suction and discharge pipes, and the "Lees" has a suction pipe 30 ins. in diameter, and a discharge pipe 27 ins. in diameter.

MOORED SUCTION-DREDGERS.

At Durban, where suction-dredgers of the moored type have been employed with excellent results, the depth of water at the entrance in 1884 was 7 ft. 2 ins., which had become 36 ft. 5 ins. in 1914, mainly as a result of dredging. Up to the end of the year 1914 the total volume of solids removed at Durban amounted to 81,737,292 tons.

The chief difficulty of dredging on the Bar at Durban is that the work has to be carried out in the open sea and subject to heavy weather. To meet such conditions, the suction-pipes of the Durban dredgers are in two parts, joined together by flexible armoured piping spanned by universal joints. The upper end of the suction-pipe is carried on a trunnion-bearing near the deck, and the nozzle end is controlled by hydraulic hoist gear designed to maintain the two lengths of pipe relative to each other in the same line of axis when working at any depth. The hoisting gear is so arranged that when the length of pipe below the joint deviates from its axis with the upper length, the hoisting gear automatically raises the lower length, thus allowing the lower end to clear the obstruction which caused the deviation.

At Lagos, pump-dredging plant is used in connection with deepening the bar at the entrance to the harbour, which has hitherto been subject to considerable fluctuations. The dredgers employed particularly for this part of the work at Lagos are the pump hopper-dredgers "Egerton" and "Sandgrouse." In their main features they are much alike, the "Sandgrouse" having a hopper capacity of 1,800 tons, while the "Egerton's" hopper capacity is 1,200 tons.

The dimensions of the "Sandgrouse" are:—

Length	291 ft.
Breadth	45 ft.
Depth	18 ft. 9 ins.

And she is fitted with two sets of triple-expansion surface-condensing engines driving twin screws, and one set of triple-expansion engines directly connected to the dredging pump. Steam is supplied by three marine cylindrical multitubular boilers. The suction-pipe arrangement permits of entire flexibility in any direction.

The remaining dredging plant at Lagos has been principally provided with a view to the reclamation of certain swamps. The reclamation dredger is specially arranged for pumping from barges alongside by means of two independent dredging pumps, so arranged that they may work either singly or in series, depending upon the distance the material is to be discharged.

The suction cutter hopper dredger for Lagos, now under construction, is fitted with one set of triple-expansion surface-condensing engines arranged to drive the dredging pump or the propeller as may be required.

The outboard suction pipe is fitted with a special drag nozzle for use when dealing with compact sand, while a spiral rotary cutter is provided for dealing with clay and harder material.

A special feature in this vessel is that four independent automatic mooring machines, four capstans, and one steam windlass are provided for mooring purposes.

DRAG SUCTION DREDGERS.

The "M.O.P. 210.C." and "M.O.P. 211.C." are selected to illustrate the drag suction or moorless type of dredger. They were specially designed and constructed to meet the conditions prevailing at Buenos Aires and the character of the material there met with.

These vessels have a hopper capacity of 1,650 cubic metres, and are each fitted with four sets of triple-expansion engines. The engines are arranged in pairs, so that all four sets are available for driving the dredging pump or the propellers separately, or two sets may drive the dredging pumps and two sets drive the propellers at the same time, as may be required. Steam is supplied by four cylindrical multitubular boilers.

When commencing work the vessel is steamed slowly ahead on the desired line of excavation, and the drag nozzle is lowered into the material until the inlet opening of the nozzle is completely sealed by the clay to be raised, so that the load on the hopper is made with the minimum amount of added water.

The drag suction dredgers "Cormorant," at Rangoon, and "Canterbury," at Lyttelton, are of the same type as those employed at Buenos Aires. The "Cormorant" is 204 ft. long, 38 ft. moulded breadth, and 17 ft. 6 ins. deep; hopper capacity 27,000 cubic ft., mean draught 14 ft. 3 ins., and speed per hour on measured mile 9½ knots. She is fitted with patent steering jets, so that the vessel can be steered entirely independent of the rudder. The dimensions of the "Cormorant" and the "Canterbury" are alike, the only difference of vital importance is the arrangement of the propelling and pumping machinery. In the "Cormorant" one pump was fitted driven by independent engines, while two sets of engines were fitted for propelling, each driving one twin screw direct. In the "Canterbury" the machinery arrangements are similar in all respects to the arrangements already described for dredgers "M.O.P. 210.C." and "M.O.P. 211.C."

DIPPER DREDGERS.

To illustrate this type of dredger, the modern 15-cubic-yard dipper dredgers "Gamboa" and "Paraiso," employed on the Panama Canal, have been selected.

The ability of these dredgers to dig into a bank of shale, sandstone, lignite, or any of the softer rocks, dispose expeditiously of a rock too large to pass through the dipper, dig to 50 ft. depth, and load into scow of almost any size, makes them very valuable tools for work of this class. They are capable of dredging 7,000 to 10,000 cubic yards of rock per day of twenty-four hours, depending on the degree of hardness of the material. The material handled by them is loaded into bottom-door steel dump scows.

The principal features of the "Gamboa" and "Paraiso" are the following:—

Each dredger has two dippers respectively of 15 and 10 cubic yards capacity. The dipper handle is 72 ft. long. The main hoisting engines are of the twin tandem compound type. The winding drum is graduated so as to give a low speed when digging. The swinging engine is of the double-cylinder high-pressure type, with steam-operated link reversing gear. The dredger is fitted with three spuds. The forward spuds are placed far enough back to allow a swing of 180 degrees for the boom. The third spud is placed centrally at the stern.

At the last meeting of the Narberth Urban District Council the surveyor (Mr. W. G. Matthias) tendered his resignation.

The death is announced of Professor Emile Bertaux, Professor at the Sorbonne, who for many years worked at the French School of Archæology in Rome. He was the author of several volumes on history and art.

A memorial to the late Mr. F. Logie-Pirie, of Burwash Weald, has now been completed, and consists of a much-needed and appropriate addition to St. Philip's Church in the form of a lych gate, executed by Messrs. H. Hems and Sons, of Exeter, to whom the work was entrusted.

The death of Mr. R. C. P. Willyams has taken place at his residence, Carnanton, St. Columb, in his 80th year. He was a Justice of the Peace and Deputy Lieutenant for Cornwall, was one of the original members of the committee appointed to form the Truro Diocese, and also served on the committee which was appointed for the building of the Cathedral at Truro.

BUILDING BY-LAWS.

The following appeared a few days since in the *Times*. The last paragraph is especially worth consideration; but one rather despairs as to the chances thereof!

Even at the present time a certain amount of building is going on, and must go on, for the lamentable shortage of cottages almost everywhere has become a serious menace to the production of food and other necessary commodities. And there is not the slightest doubt that this house famine is largely due to the building regulations now in force, which have had the effect of deterring or adding needless hardships to the efforts of cottage builders. Both the cost of building and the rate of interest are at present so high—and will probably remain so after the war—that the abolition of many of these out-of-date and inconsistent enactments has become a question of national importance. Having been founded on the "model" series issued forty years ago by the Local Government Board, all building by-laws have long become obsolete. They take no account of modern improvements or the use of new materials (such as concrete), and it is no exaggeration to say that most of the progress made in the way of economical construction has been dependent on loopholes that may be found in them. These by-laws were originally drawn up for governing building procedure in town areas; they have mischievous consequences when applying in rural districts. To keep up a high sanitary standard and to prevent flimsy construction is essential. But some of the present limitations, however imperative they may be in crowded centres, are unnecessary in the country, where buildings are often of a single story and far apart from each other. The danger of fire or infectious diseases spreading to neighbours is non-existent.

How inconsistent the "ridiculous" by-laws are can be seen in some neighbourhoods where a different set is in operation on opposite sides of the same street. Then take as an instance the question of room heights. This is an important matter where cost is the main factor (as it always is when cottages are being considered), for high rooms mean expensive high walls. Some local authorities insist on ceilings being 9 ft. up, but say nothing as to the length and width of rooms, although floor space is far more essential than abnormal loftiness. Rooms 7 ft. 6 ins. or 8 ft. high are much warmer and cosier, and can be equally well ventilated by a proper arrangement of opening windows. And a low cottage, besides being cheaper than a high one, is more in accord with surroundings of hedgerow and coppice. There are districts in which the tops of windows may be 6 ft. above the floor; elsewhere this height has to be 7 ft., and sometimes 7 ft. 6 ins. (which once cost a client of mine an extra £100). As an actual example of the waste of money caused by differing drainage regulations, I can mention two groups of munition workers' cottages I have recently been engaged on, which were built within a few miles of each other by the same contractor. The varying by-laws made a difference for the drains alone of more than £20 per dwelling.

GORDON ALLEN, F.R.I.B.A.

Holmdale Road, Hampstead.

The Scarborough Gas Company undertakes to supply and fix free of charge the best quality upright or inverted mantles at one penny each. It is explained that although the cost to the company of each mantle is 3½d., the loss that would be incurred would be made good out of the profit derived from the production of the benzol extracted from the gas at the request of the Government.

The directors of the London County and Westminster Bank, Ltd., after making provision for bad and doubtful debts, providing £319,000 for depreciation of investments, and applying £100,000 in reduction of bank premises account, have declared a dividend of 9 per cent. for the past half-year (less income-tax), making a total distribution of 18 per cent. for the year 1916, leaving a balance of about £182,290 to be carried forward.

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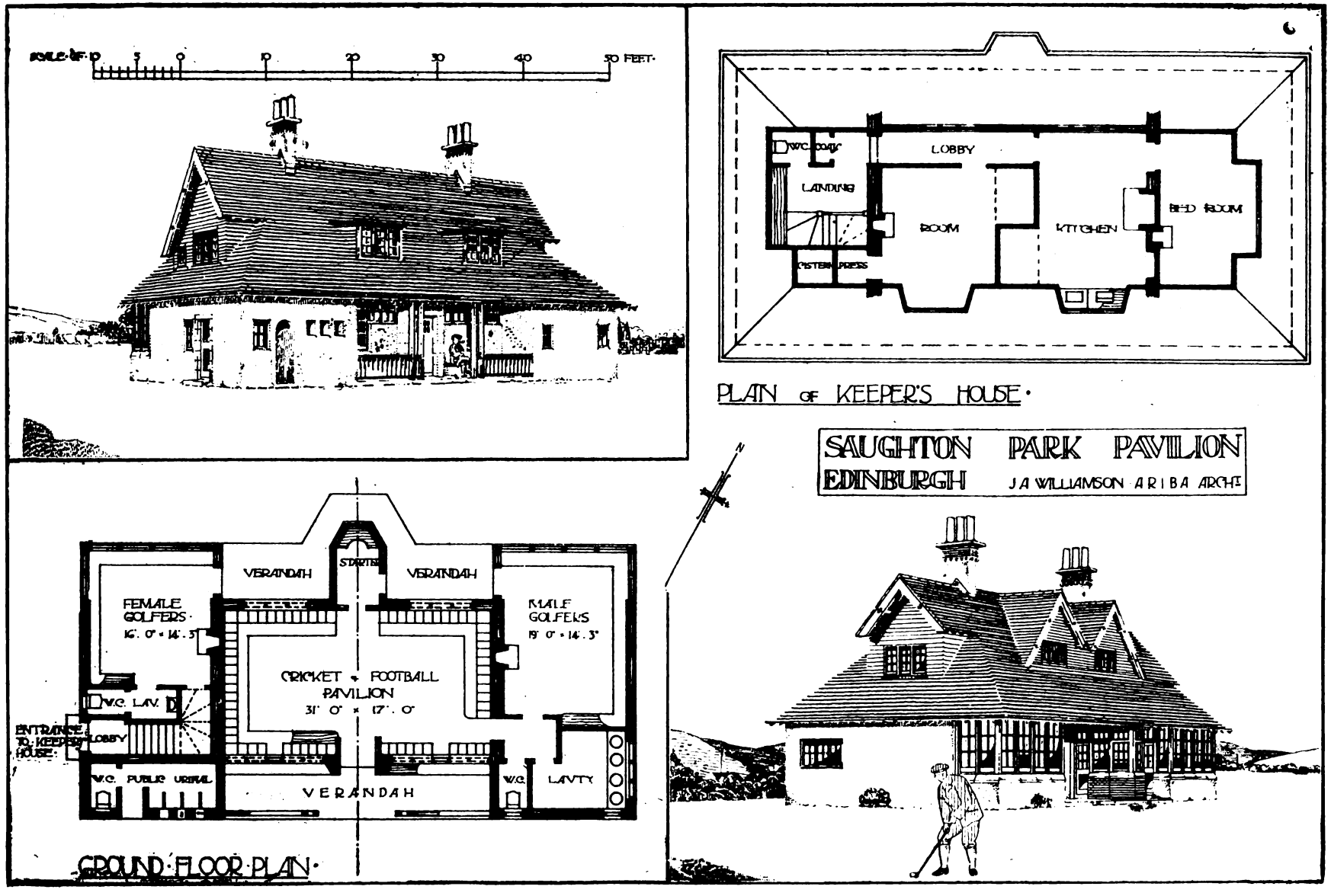

SPORTS PAVILION, SAUGHTON PUBLIC PARK, EDINBURGH.

Mr. J. A. Williamson, A.R.I.B.A., City Architect, Edinburgh.

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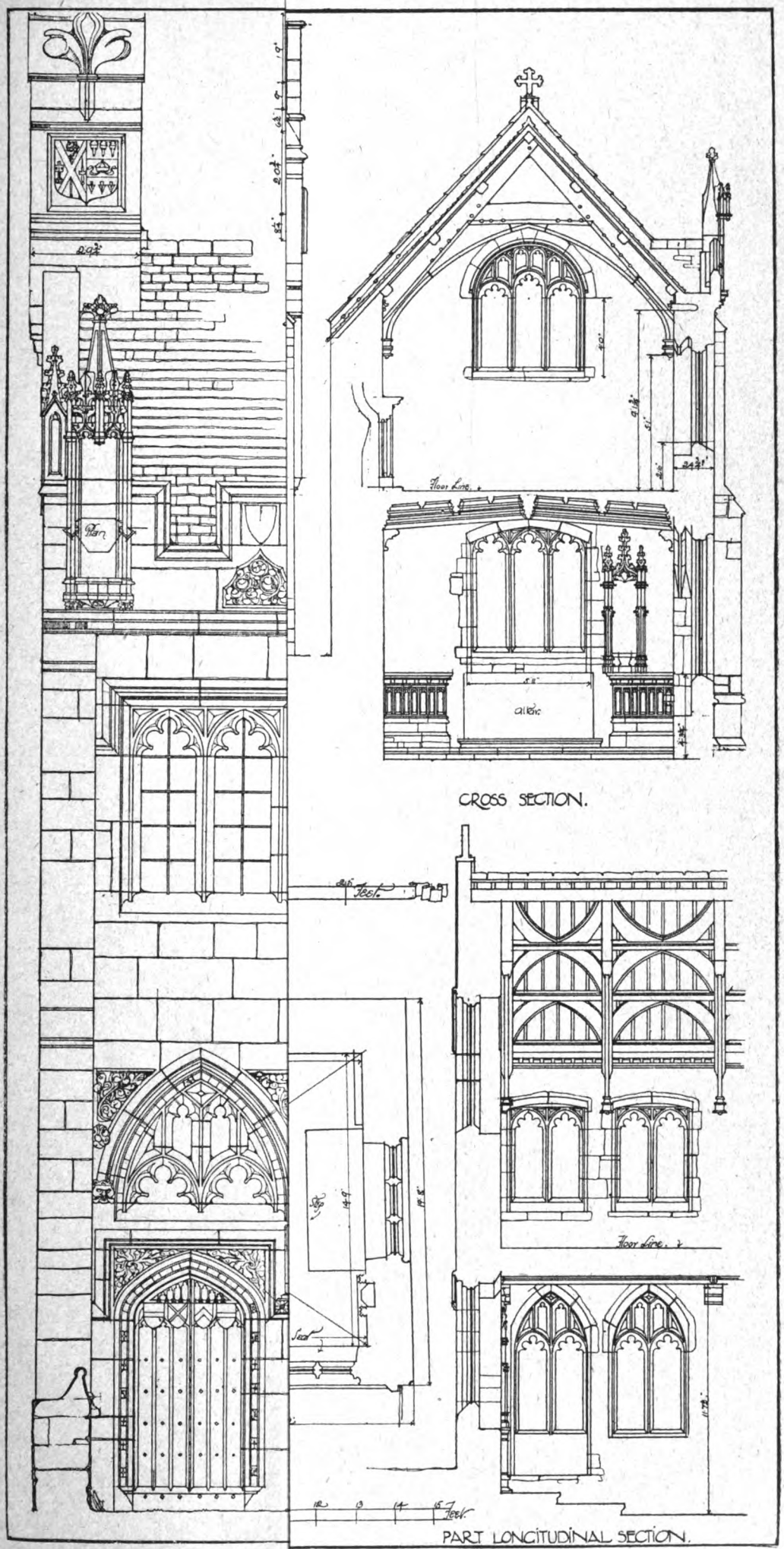

THE LIBRA Mr. JAMES MACGREGOR, Architect.

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From a photograph by Mr. Richard Moreland.

CHURCH OF ST. CATHERINE, NEASDEN, MIDDLESEX VIEW FROM SOUTH AISLE INTO CHOIR.

Mr. JOHN S. ALDER, F.R.I.B.A., Architect.

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A SUITE OF PAINTED FURNITURE AT WINDSOR CASTLE.
Designed and Decorated by LADY KINLOCH for HER MAJESTY THE QUEEN.

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Our Illustrations.

CHURCH OF ST. CATHERINE, NEASDEN, MIDDLESEX.

The parish of Neasden-cum-Kingsbury is unique in the Diocese of London. It consists of Neasden, once a small hamlet which has during the last decade developed into a large residential centre for the employees of the Metropolitan Railway, and it also includes part of old Kingsbury, where the ancient parish church, restricted to the capacity of seating only 120 persons, dates back to Saxon times. It is situate midst the wooded fields adjacent to the Welsh Harp reservoir. St. Catherine's, the new church herewith illustrated, stands at the corner of Dollis Hill Lane, in a very commanding position near the Neasden Golf Club links. The first portion of the church was consecrated last Spring, but the war has hindered the completion of the nave and western end. The old church and the new one are a mile apart. In the former the late W. E. Gladstone used to read the lessons when visiting the Earl of Aberdeen at Dollis Hill House, now in use as a V.A.D. convalescent hospital for soldiers. It is the property of the public. Hard by in the old village Oliver Goldsmith wrote "She Stoops to Conquer" and "The Vicar of Wakefield." Neasden is rich in other historic associations from the earliest era. There was a Roman encampment here used by Cæsar on his march from St. Pancras to St. Albans by way of Edgware, as described by Stukeley, the antiquarian. Mr. John S. Alder, F.R.I.B.A., of Arundel Street, Strand, is the architect of the new church which consists of nave, chancel with north and south aisles and a side chapel. The photograph of the interior of the east end, reproduced among our illustrations, was taken by Mr. Richard Moreland. Mr. Moreland is a water-colour painter and amateur photographer. He naturally wishes it to be understood that his photographs are not professionally produced, and he alone is responsible for the points of view selected for his pictures, which avoid the usual conventional methods of aspect. We shall give an exterior view of this church at an early date.

THE LIBRARY AND CHAPEL, THE VICARS' CLOSE, WELLS CATHEDRAL, SOMERSET.

On various occasions we have given sketches and drawings of this cathedral, palace, and vicars' close, but no measured details of this beautiful library and chapel such as we publish to-day have appeared in our pages. These excellent studies, to good, large scale, have been lent us by Mr. James Macgregor, of Dunfermline. This double page is very complete with a plan, sections and end elevation delineated alongside the larger scale detail of this choice façade. The vicars choral attached to the cathedral were chantry priests first ordained at Wells by Bishop Joceline in 1237. No regular establishment for their housing was provided, however, till Walter de Hulle (sub-dean of this cathedral in 1334 and Archdeacon of Bath, 1342) gave lands and two messuages at Wells in order that the thirteen chantry priests might live together in community. This intention was carried into effect by Bishop Ralph de Shrewsbury in 1347. He erected the hall with the west-end side windows, and also the quaintly designed pulpit over the fireplace, where grace was said. His plan provided houses for the brethren on a uniform scale, comprising a keeping-room below and a sleeping chamber above, but the tenements had no offices whatever, save only a store closet, beyond which there was a yard. Some of these old dwellings remain intact, but others have been altered, or two thrown into one holding. The common hall originally afforded ample accommodation for refectory purposes, and the kitchen adjoined for sufficient service. The vicars, consequently, only needed simple lodgings of their own without kitchens and larder offices. These houses range picturesquely on either side of the tapering quadrangle, which measures 436 feet long, with a width of 65 feet next the gatehouse to 56 feet at the chapel end of the close, which looks almost rectilinear in form. The gate is at the southern end, opposite to the chapel on the north extremity. The library is reached by a spiral stairway. The institution provided at the outset for two principals, the chaplain's residence being situate at the west of the library, which has a charming open timber ridge roof. Each of the little stone-built dwellings has a lofty cut stone chimney standing in a line with the frontage walling, and each house has an enclosed garden forecourt. Several of the old masonry porches are in situ, but not a few have been transmogrified by Georgian bay windows, hooded door heads, and stucco plastering outside the stonework facings. In one of the restored tenements is a most admirable mediæval interior fitted with antique furniture. It is an artist's house, and by a door in the party wall two houses have been united. Above is a studio with the old roof timbers showing. The heart of the close is the chapel, which has been ascribed to Bishop Ralph of Shrewsbury. The traceries of the well-designed windows are of his time. The doorway, which originally stood, according to Pugin, in the centre of the west-end of the chapel, is now set in under one of the window-heads on the south side, as shown by the accompanying drawing. Various heraldic devices are carved on shields at the heads of the panels of this door. The drip stone of the hood moulding is cut off on one side against the adjacent buttress, and the centre of the opening arch does not line with that of the traceried window-head above it, showing that the door is an insertion. De Beckyngton's arms are carved upon a shield on the side of the bell turret. His executors repaired the close buildings in the fifteenth century, and another evidence of their work occurs on the chimneys, where the rebuses make so notable a feature. The gateway was carried out by Bishop Ralph in 1360. Richard Pomeroy lengthened the premises at the east end, and set up the chain gate in the reign of Henry VIII. The vicars' close escaped the fate of other religious houses at the Reformation, "although some sacrilegious people hoped to spoil it; but Elizabeth, thinking such a villainous deed would not be borne," granted a charter from Westminster in the twenty-fourth year of her reign, constituting them a body corporate and politic, with the title of "Principals, Seniors and Vicars Choral in the Cathedral of St. Andrew, Wells," and limiting the college to twenty, with fourteen as a minimum. The change in the value of money and subsequent neglect, notwithstanding Royal protection, brought about a bad state of things, including the use of the gatehouse by a brewery and malting. In 1863 the buildings were restored, and the common hall was decorated by the late William Burges, who painted the figure of St. Andrew in the large apartment above the chimney piece, which he designed. Mr. Haywood Sumner decorated the interior of the chapel with a series of sgraffito subjects, and the metallic lustres of figures above the dado of the screen were painted by him. The beams of the chapel ceiling form four large panels subdivided into four smaller compartments, which again are made up of four smaller ones. The timbers are richly moulded, and have carved wooden bosses at their intersections, standing out in bold relief. The late J. D. Sedding was appointed the cathedral architect in 1883, and he carefully looked after this chapel, but we do not know whether he repaired this façade, over which he was most enthusiastic. A bird's-eye view of the vicar's close, including the gatehouse, was published from the pencil of the late C. E. Mallows in THE BUILDING NEWS for July 19, 1889, while in our issue of July 20, 1883, a sketch of the chain gate and street front will be found, drawn by Mr. Maurice B. Adams, together with two plans of the hall and gateway, as well as a plan of one of the houses in the close. The college library is a most delightful apartment, and we printed an exquisite drawing in pencil of its interior by the late C. E. Mallows on August 10, 1894, in which number a plan of the cathedral precincts at Wells, indicating the position of the vicars' close, will be found. A larger plan of the cathedral and cloisters was, at the same time, included for reference. In the issue for August 17, 1894, a view of the choir and staircase to the chapter house appeared, sketched by C. E. Mallows. On January 5 last a double page appeared with an article and plan in illustration of the Bishop's Palace at Wells by Mr. Maurice B. Adams.

SPORTS PAVILION, SAUGHTON PUBLIC PARK, EDINBURGH.

This pavilion is a prominent object, viewed from the railway from Edinburgh to Glasgow and the north. The Park of Saughton belongs to the Corporation of Edinburgh, and extends to about 100 acres, acquired some years ago at a cost of £55,000. The northern section is allocated to golf, football, and cricket. This building, therefore, is devoted to accommodating in a central position those taking part in these sports. The grounds devoted to football and cricket are made interchangeable, so that the building and sports area can be used in combination, these games being played, of course, at different times of the year. The pavilion is built of brick, and roughcast. Ruabon tiles are used on the roof, and all woodwork is painted white. The upper floor is allocated to the greenkeeper. The building cost about £1,000, and was carried out to plans and under the supervision of the architect to the Corporation, Mr. James A. Williamson, A.R.I.B.A.

A SUITE OF PAINTED FURNITURE AT WINDSOR CASTLE, DESIGNED AND PAINTED FOR HER MAJESTY THE QUEEN.

Towards the end of the eighteenth century a fashion prevailed of painting furniture, brought about for the most part by the influence of the Brothers Adam, and also by the then popular mural and ceiling panels decorated in colour by Angelica Kauffmann and her school of painters. Lady Kinloch of Gilmerton, with the laudable view of employing women artists, has lately established an industry for decorating and painting present-day furniture on similar lines by endeavouring to revive the taste of Pergolesi, Zucchi, and Cipriani. The Queen has brought the movement into prominence. A room at Windsor Castle, during recent structural renovations of the private apartments, was set apart for the reception of a suite, specially designed and decorated under the direction of Lady Kinloch. We give a photograph showing four of the principal pieces. All of them are new, excepting the old Hepplewhite chairs belonging to Windsor Castle. One of this set is included in the illustration. The Pergolesi cabinet shown is described as a transcript of a genuine eighteenth-century one. The vogue thus emulated was not enduring, owing to the fact that painted furniture readily suffers from stains, and everyday use spoils it, the surface being so liable to scratch. Repairs cannot be satisfactorily done without repainting the entire object, or perhaps large portions of its colour scheme. Sofas and suites of chairs to match in painted beech or birch wood were produced by Hepplewhite, Mainwaring, and their contemporaries. These were upholstered in cashmere, painted in patterns to match the general design of each piece. The commodes of the period usually had circular fronts or were designed with concaved ends, flanking convex centres. This insured good serpentine lines of elegant contours. Their surfaces were decorated with landscapes in ovals and flowers, or intermingled by figure-work after the prints of Bartolozzi, or sometimes by architectural compositions by Francesco Piranesi. Several layers or coats of paint were applied and carefully rubbed down (as in coachmaker's body work) with fine sandpaper in succession, and then polished. The ground tints varied from white, cream, green, and even black, on which the coloured decorations were skilfully executed. The choicest work was limited to articles not likely to be subject to hard wear, such as fire-screens and occasional tables. Half-circular pier tables were very favourite subjects. Table-tops had sometimes copper-sheet insertions fixed into them to take wear and tear. The legs and arms of window seats, called "loving stools,"

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often had the arms and legs gilt like the friezes of bigger pieces, decorated with griffins, honeysuckle, and other pseudo-classic ornament. When curtains and draperies are painted as margins to the furniture panels, as in this Queen's cabinet, the effect is deteriorated by increasing the faults of the style. Messrs. Tredegars, Limited, executed this cabinet work. They lent us this photograph. Oyster-white serves as the ground colour, and the ornaments are in bright rich shades.

OBITUARY.

Mr. Herbert Batsford, the managing director of the well-known firm of architectural publishers and booksellers, died somewhat suddenly, after an illness of nine months, at his residence at Golders Green on the 14th inst. Herbert Batsford, the third and youngest son of the late Bradley Thomas Batsford, by whom the business was founded in 1842, was born in 1861 and educated at the Philological School, Marylebone. He intended to devote himself to the practice of the law as a barrister, and for this profession he had early shown remarkable aptitude. However, the death of an elder brother in 1882 caused him to enter the family business, with which he has been continuously associated ever since, and which bears the stamp of his energy and enterprise. Mr. Batsford had an extraordinary knowledge of art books, prints, and engravers, especially those of the 17th and 18th centuries. This knowledge was founded upon keen artistic perception and a great admiration for the work of the masters of these periods. Mr. Batsford made several original discoveries, notably the existence of an earlier state of Piranesi's extraordinary imaginative "Carceri." In addition, Mr. Batsford did much to develop the publishing activity of the business, especially during the past ten years. Many of the more important books of the firm were not only supervised and produced, but owed their inception, to his insight and initiative. Amongst the books may be mentioned the two folio volumes on "The Domestic Architecture of the Tudor Period," which he entrusted to the late Thomas Garner, and which were afterwards completed by Mr. Stratton. Other volumes were Richardson's "Monumental Classic Architecture," Vallance's "Oxford Colleges," Bond's "Gothic Architecture," Ward's "Du Cerceau," Swarbrick's "Brothers Adam," Statham's "Short Critical History of Architecture," Tanner's "Interior Woodwork," Stratton and Wade's "Bruges," and Adams' "Modern Cottage Architecture." He aimed consistently at a high ideal of attainment, and his enthusiasm was frequently a source of encouragement and even inspiration to the authors and those who worked with him. Mr. Batsford was active in issuing art publications up to the summer of last year, when he prepared, in conjunction with Mr. Walter H. Godfrey, F.S.A., an interesting monograph of "English Mural Monuments," while as recently as December last he personally supervised the production of a record on "Port Sunlight" by Mr. T. Raffles Davison. As an instance of Mr. Batsford's broad literary sympathies may be mentioned the Series of "Fellowship Books" in eighteen volumes by well-known writers, which he issued some three years ago. Associated with Mr. Herbert Batsford in the business for the last twenty years have been his nephew, Mr. Harry Batsford and Mr. W. Hanneford Smith, who as the two remaining directors will continue the business.

The Hythe Town Council recently decided to carry out certain improvements, but Councillor J. B. Tunbridge wrote to the President of the Local Government Board protesting against such expenditure in war-time. The Board communicated with the Council asking for its observations on the matter. At the monthly meeting of the Corporation the Mayor (Mr. W. R. Cobay), the originator of the scheme, offered to lend the money free of interest until after the war, and the offer was accepted on the motion of Council Tunbridge.

THE ROMAN WALL FROM NEWCASTLE TO CARLISLE.

A WAR LESSON FROM ANCIENT ROME.

Professor F. Haverfield, Camden Professor of Ancient History at Oxford, had prepared a paper on "The Roman Wall," from Newcastle to Carlisle, to be read before the Chester and North Wales Archæological Society, but was unable to make the journey north, and in his absence the paper was read last week by Miss M. V. Taylor, who assisted the professor in the preparation of his work.

The paper stated that the ruins of the Roman wall, the northern frontier defence of Roman Britain, still stretch from Wallsend-on-Tyne, three miles east of Newcastle, to Bowness-on-Solway, twelve miles west of Carlisle. One of the best tests of an Empire's vigour was certainly the amount of strength which it could exert, without overstrain, on its really remote frontiers. When it failed to maintain these, to defeat its distant enemies and control its distant officers, it was probably nearer to its decline and fall than when it had ceased to conquer more and more territory. In one military respect the Empire closely resembled the world of to-day. In it the defensive was far stronger than the offensive; towns were rarely taken by storm, but often by hunger; the prevailing arm was heavy infantry; cavalry was of little account. No one would be surprised to hear that this age of wall defence, of trench warfare, as we should call it to-day, produced no great general who could be ranked with Hannibal, Marlborough, or Napoleon as a genius in tactics or strategy.

Professor Haverfield ventured to assign the fall of the Roman Empire to a reason which was in most minds to-day. He did not attempt to predict how far attrition might be likely to overthrow our present enemies, but he had little doubt that attrition was a real factor in great wars, and he thought it destroyed the Empire of Rome. Long plagues and long frontier struggles against the inexhaustible man-power of the barbarian invaders gradually wore down the imperial fighting strength. If we should learn any lesson from the Roman Empire it was that which seemed to be in many enemy mouths to-day, the lesson of Durch-Halten. That to-day a Roman culture was spread over Western Europe, that we were the allies of France, of Italy, and (in Roumania) of a Hohenzollern prince, was in part due to the cold tenacity of the Roman frontier defence. Guns and munitions in inexhaustible numbers were the only help against human hurricanes, and that Rome had not these was hardly her own fault, but that of the slow progress of all mankind.

The Roman Wall was 73½ miles long, and survived in innumerable fragments, which, in respect of its history, presented some exceedingly difficult problems. It was a complex structure, and, like the lines now stretched out across Western Europe, it was not one single rampart, but a succession of ramparts, one behind the other. In front of the wall, with scarcely an intermission, ran a deep, broad ditch, and behind the wall ran a second work of loose earth. Excavations he had conducted near Gilsland revealed yet another line. These lines of trenches, just like ours of to-day, had their appropriate fortresses, blockhouses, and turrets at suitable intervals. The whole length of the wall was connected together by a substantial road some 17-18 ft. across, stoutly paved with cobbles and edged with kerbs, and there were milestones. More excavations, especially in the forts, were needed to answer many questions, and perhaps even that would not banish all obscurities and doubts. He had little hope that the various obstacles, local and personal jealousies, and the like, ever would be sufficiently overcome to admit of real success, and this was not the moment even to dream of a work which would cost some thousand pounds, and need the attention of many skilled supervisors, hard to collect even in peace, and the toil of many able-bodied labourers. Had the neighbouring University of Durham been inclined to attack the task much might have been achieved in the past.

TESTS OF CONCRETE SPECIMENS IN SEA WATER, AT BOSTON NAVY YARD.

By R. E. BAKENHUS, M.A., M.Soc.C.E.

A paper, presented January 3, 1917, to the American Society of Civil Engineers, describes a test of twenty-four concrete specimens which were immersed in sea water for seven years. The object of the tests was to determine the action of sea water on concrete specimens of wet and dry consistencies, of various proportions of ingredients, and of different brands of cement, as well as the effect of special compositions.

The methods of mixing, analyses of the various cements, sand, and stone, and the conditions of the test, as well as all other data having possible effect on the results, are stated in the paper. The information is given in tabular form where possible.

The specimens were examined at intervals of about one year, and record was made of their condition. The results of these observations have been tabulated, and show progressive deterioration of some of the specimens and remarkable durability of others. Recently, the specimens were examined with great care, and graded in the order of durability. These results are also tabulated. Independent tabulations are made of the various series of tests originally planned, to ascertain in one case the effect of wet and dry mixture, in another case the effect of rich and lean mixture, and in others the effects of special brands of cement, and of using lime, Sylvester wash, etc., with the cement.

The results are interesting, and seem to show, briefly:

(a) That the 1 : 1 : 2 mixture is superior to the 1 : 2½ : 4½, and that the 1 : 2½ : 4½ is, in turn, superior to the 1 : 3 : 6;

(b) That the wet mixtures are superior to the dry;

(c) That the effects of magnesia or alumina in varying proportions are not very marked, and follow no apparent law, although the two most durable specimens are those lowest in alumina content;

(d) That extra care in mixing produced decidedly beneficial results;

(e) That hydrated lime was of no benefit, but rather a detriment;

(f) That the addition of Sylvester wash was harmful; and

(g) That the addition of clay to the cement had a slightly beneficial result.

The deterioration occurred between high and low water, and was most marked at mid-tide. Above high water there was little deterioration, and the same is true, but to a less marked extent, of the concrete continually submerged.

The experiments are not sufficiently extensive to warrant drawing final conclusions in all cases, unless confirmatory evidence is available. In utilising the results, the limitations of the tests and local conditions should be taken into account.

It has been arranged that the Gladstone Memorial in St. Andrew Square, Edinburgh, will be unveiled to-morrow (Thursday) at noon by Lord Rosebery.

The first plan lodged for several months for a new dwelling-house in Rochdale was passed by the Building Committee last Wednesday.

A gift has been made to St. Mary's Church, Kettering, of a rood beam, with three carved figures in wood, as an in memoriam thank-offering.

Mr. Lucius O'Callaghan, F.R.I.A.I., of Dublin, has been appointed by the Lord Lieutenant as Governor and Guardian of the National Gallery of Ireland for a term of five years.

The engagement is announced of the Rev. Michael Weldon Champneys, younger son of Mr. and Mrs. Basil Champneys, to Caroline Helen Mary, only child of the late Thomas Saunders Guyer and of Mrs. Guyer, of Bexhill.

At Chester last Thursday Mr. William Henry Lancaster, formerly land agent for the small holdings under the Cheshire County Council, pleaded not guilty to charges of embezzlement and falsification of books, and was committed to the assizes for trial. There are twelve charges, involving a total sum of £218. On behalf of the prosecution it was alleged that the total defalcations were close upon £1,800.

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REPOPULATION OF OUR RURAL DISTRICTS.*

By THEODORE G. CHAMBERS (Fellow.)

The depopulation of the rural districts is not a modern trouble to communities. It has troubled monarchs and statesmen throughout the ages. Mediæval monarchs constantly tried to stem the tide of emigration from the country by making laws to prevent it. Six times in the sixteenth and seventeenth centuries efforts were made to prevent the growth of Paris, and during the reigns of the Tudors and Stuarts the growth of towns in this country and the emigration from the rural districts were the sources of much anxiety.

The real danger to the body politic lies not so much in the mere depopulation of particular areas as it does in the separation of the inhabitants of a given country into two camps, with completely different and often hostile economic conceptions.

The extent and rapidity of the movement in the past hundred years has been remarkable. In the year 1851 there were in 580 towns in England and Wales a population of just under 9,000,000. The rural population—and it was then even more of an agricultural population than is the rural population to-day—was almost exactly the same figure. Even at this date the economic interests of the townspeople and rural dwellers were often incompatible, but the equal distribution of the population did not give a preponderance of power to the one or the other. Even with the rapid growth of the urban population the political power of the landed classes enabled the claims of the rural economic interests to be upheld for some years as against the growing weight of the commercial and industrial economic interests.

But by the year 1911 the growth of the urban population made the country predominantly urban. In that year 78 per cent. of the population of England and Wales, or over 28,000,000 people, were living under urban conditions, while only 22 per cent., or under 8,000,000 people, were living under rural conditions. As regards their economic interests, the disparity was even greater than these figures indicate.

Overcrowding is a relative matter, and there may be differences of opinion as to what constitutes overcrowding, and to what extent technical overcrowding is in itself injurious. But most people will agree that the condition of living more than two persons per room, which has been adopted as the official standard of overcrowding, is an indication of other conditions which will probably be morally and physically detrimental. That there should still be 3,139,472 persons, or 9.1 per cent. of our population, living in these conditions, is a sorry commentary on our civilisation. That this condition is often coincident with the collection of masses of people in limited areas is only what one would expect. This is borne out by official figures, which show that while the average population living more than two in a room in England and Wales is only 9.1 per cent. of the population, it exceeds 10 per cent. in 31 of our cities over 50,000 inhabitants, it exceeds 15 per cent. in 12 of them, and in 5 cities it actually exceeds 30 per cent.

Although vital statistics do not prove that the modern well-ordered city is detrimental to health, it can certainly be said that the concentration of population in the circumstances which existed in the towns of the past produced an enormous drain on our vitality. Excessive urban mortality is mainly due to lack of pure air, water, and sunlight, together with uncleanly habits of life. But, as Weber justly says, "There is no inherent and eternal reason why men should die faster in large communities than in small hamlets provided they are not too ignorant, too stupid, or too selfishly individualistic to co-operate in the securing of common benefits."

We may safely assume, therefore, that all classes in the community will now agree that it is desirable (1) to attract a larger population to the land, and (2) to increase the production of food in this country, and so to reduce the amount which has to be imported from abroad, (3) to take such steps as may put an end to the detrimental effect of certain urban conditions on the stability and physical strength of the nation. The difficulty is to construct a policy broad enough and big enough to effect such profound changes as are implied in these three statements.

In the direction of assistance which the State might afford the agricultural producer without detriment to the economy of the town dweller, I would place improved means of communication. The system of uniform railway charges in certain geographical zones, which might be of assistance to the home producer, would certainly be more feasible under unification.

The effect of this system must tend to eliminate the factor of transportation facilities from the advantages or disadvantages of particular localities for production. The zone tariff system has, I believe, been successfully developed in Hungary; but it has to be borne in mind that such a system of uniform rates would have less effect on a sea-girt territory like the British Isles than it would have in an inland state. The bearing of an extended coast line on the problem can be at once grasped when we realise that one-fifth of the population of England and Wales is situated at eight of our chief ports of entry, and that, however we may manipulate our inland transport rates, seaborne produce can always reach these great centres of population by water. Nevertheless, the several decentralising effect of the zone tariff system cannot be overlooked in its bearing on the agricultural problem. It would inevitably tend to distribute the poulation over a wider area, thus tending to take the markets for produce nearer to the producer. Unification might also lead to a more enlightened policy as regards canal and road transport. In the direction of the fuller control of the roads by the State and in the extension of motor services there lies much room for constructive policy in aid of agriculture.

We may now consider what steps can be taken to bring about this industrial penetration of the rural districts. One of the most potent influences on the depopulation of the rural districts has been the centralisation of manufactures, with which the direct attraction of the city is so intimately connected. The industrial capitalist has sought the town for many definite economic reasons. The wage-earner has been attracted to the towns by the higher wages paid by the industrial capitalist and by the interests, amusements, and educational facilities which he undoubtedly finds in the town. Wherever capital goes there is a tendency for labour to follow. If the industrial capitalist can be drawn out of the town into the country, the wage-earner will soon go after him, and he will soon create his interests, amusements, and educational facilities.

In the garden city conception there lay much wisdom, and it has been unfortunate that the garden city movement has so largely developed into little more than the construction of garden suburbs. The motive of the initiators of the garden city was rather the industrial penetration of the rural districts, than the mere improvement of the life of the town dweller by taking him out of the city to sleep, beneficial as this is in itself. The policy has only been partially successful. The Letchworth Estate was purchased in 1904, and may be said to have reached in twelve years a tolerably secure position, but its rate of growth has been extremely slow compared with that of towns which spring up by means of natural causes. The history of Letchworth proves the extreme difficulty of endeavouring to force human movements in the presence of adverse economic factors. The arguments in favour of carrying the town boldly into the country can be easily stated and will be readily accepted, but with the advantages there will be certain disadvantages, and it will be convenient to consider these together.

The manufacturer gets the advantage of cheap land, enabling him to erect roomy convenient factories with one storey and a good light. Everything is on one floor and under one roof. The cost of building is less, and the cost of upkeep is less. A high ground rent tends to buildings of many floors, and high buildings entail increased haulage. In many trades—for example, printing—the clear air and absence of dust make for improvement in work.

The removal of the factory from the town would, in many cases, also tend to provide the manufacturer with a higher class of labour. The conditions under which the operatives would live would improve their physique and increase their power of production. The operatives could be not only well housed, but they would live under conditions which would make for their greater happiness and well-being all round. Generally speaking, manufacturers requiring the best type of labour would gain, but all manufacturers would not find an advantage. In a great city a certain type of employer is able to draw upon casual labour. Even those who have provided garden dwellings for some of their labourers seem to be compelled to draw a considerable amount of cheap female labour for certain operations from neighbouring congested towns and cities.

Cheap transport is more vital to many industries than is cheap land. The ultimate deciding factor is profit. It is no use offering manufacturers cheap land and a better type of labour, if other elements which they have to consider outweigh these. All that has been said on the question of the unification of railways, managements, road and canal transport facilities, has an important bearing on the question of industrial penetration of the rural districts. Generally speaking, it may be stated that no movement of the kind can be produced unless the capitalist is convinced that it will pay him to set up his enterprise in the country. He cannot be forced to go where he thinks he will lose his money. As we have said, the worker will tend to follow if capital leads the way. But it is necessary to do something to make the worker desire to leave the towns and to keep him in the country.

From the point of view of the operative there are arguments for and against the garden city. On the face of it there are certain material advantages. Life as a whole may be more desirable in theory. His housing conditions may be excellent. He can combine a certain amount of food growing with his ordinary avocations. It must, however, be remembered that the worker in many trades is not very keen on turning out into his garden after his ordinary day's work is done, however much of an economic advantage it may offer him from the point of view of the lecture room. Unless the new city is designed on a certain scale with schools and amenities in excess of its early requirements, the worker will have reasonable fear for the education of his chidren and for his own and his wife's amusements and interests. The average town worker is not particularly keen on country life, and the very poor cling to their own streets and would not exchange their surroundings for any of the advantages of the garden city.

It is probable also that the worker feels a greater sense of liberty in the large city. He and his family have a great choice of occupation. If he moves into a new town with less range of employment he runs a greater risk of unemployment. Single industry towns are always liable to become bad places for the operative in the event of economic difficulty affecting that industry. The greater the number of industries the less chance there is of widespread unemployment. Again, the garden city under the control of an employer is not an altogether ideal place from the point of view of the operative. Nevertheless, as we have hinted, the question of the wishes and feelings of the operative is a small part of the problem. If the means of livelihood is offered in the new city the operative will go there, and although he may grumble, he will stay there so long as he can earn his living. There will be distinct racial benefits from the improved conditions, but the conclusion we have to accept is that the urban exodus can be obtained only by inducing the capitalist producer to put down his capital in the country.

It may be interesting to consider whether the State could assist the movement to some extent by making employers of labour responsible for the adequate housing of those they employ. In this country 250,000 males and 50,000 females are employed by the

* Read at the ordinary general meeting of the Surveyors' Institution, held on Monday, January 15, 1917.

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national and local Governments, 397,000 are employed on the railways, and over 1,000,000 in mines and quarries. Neither the State nor the local authorities, nor the industrial capitalists have in the past shouldered their responsibilities in the matter of housing. The Central Government, the local authorities, and the railway companies should, in my opinion, be made responsible for housing their own servants. The great capitalist corporations of the future, with their large resources, their ability to purchase large blocks of land at a cheap rate, could easily lay out and build on a large scale, and could house their operatives in a manner immeasurably superior to those existing, and such a course of action would have a direct effect upon the power of production of their employees and be beneficial to the community as a whole. The question is admittedly a difficult one. Unless great care were taken there would be serious hostility on the part of labour.

In spite of all the difficulties of the question there is to day a sufficient movement in the direction of the industrial exodus from cities to warrant a belief that the tendency is likely to continue and to increase in momentum.

The tendency to decentralisation of industry has certainly become marked in the United States. Many manufacturers have realised the disadvantages of city conditions. They have moved to avoid the burden of high rents and high rates and the hindrances to rapid expansion which exist in the congested conditions of the city, and where often expansion of any kind is impossible. Improvements in transportation, which enable the manufacturer to be at some distance from his markets of purchase or sale, and the telephone and rapid post system, which enable the policy of a business to be efficiently directed from a mere office in the city, have all aided the movement.

"In recent years," said Weber, "the decentralising movement has taken a still more favourable turn, largely as a result of continued improvements in transportation methods and a more enlightened policy on the part of railway managers, who have learnt that the factor of distance is of minor importance in the expense account as compared with the additions to the revenue that result from a judicious encouragement of industries in small cities along their lines."

To-day we see the same movement growing in this country. Every railway company is now advertising cheap sites for factories bordering their systems. This policy would probably have begun much earlier if we had permitted the railway companies to hold belts of surplus lands.

Much might be done to assist movement by providing a clearing-house for information as to the advantages of different districts from a commercial point of view. Tabulated statements might be prepared by the Board of Trade giving for each district information as to cost of land, rates, means of communition, railway rates, proximity of coal and iron and the raw materials, and other data, to enable manufacturers to judge of the desirability of moving their works. Greater financial assistance might be given to public utility societies instituted for the provision of works of public utility, such as housing schemes, transport facilities, and all that class of enterprise which is intended for group benefit.

The vital problem of the near future is to discover the happy mean between State assistance and State control. There are to-day four classes upon whom the lives of the people may be said to depend: the Central Government, the local authorities, the individual capitalist, and groups of the people themselves, and the future welfare of the mass of the citizens will, to a great extent, be determined by the division of responsibility between these four. The function of the State appears to me to be that of delegating to the other three the functions which they are best adapted to perform for the general welfare.

In the direction of increased power and responsibility in the hands of the local authorities there is room for much determined thought. The local authorities throughout the country have, generally speaking, risen to the occasion during the war. Burden after burden has been thrust upon them by the Central Government. They have had to undertake immense responsibilites and most onerous duties, and they have proved up to the hilt that the policy of boldly delegating responsibility breeds the power to shoulder such responsibility. If, after the war, individual citizens of leisure and education will grasp a sense of their duties to the State and will enter the field of municipal activity, placing their brains and powers at the service of their localities, serving as members of councils and taking an active share in local administration, it will have an immense beneficial effect on the well-being of the State. There are functions which the local authorities possess to-day, but which are rarely used, which would have a great influence on the lives of the people.

The welfare of the new town of the future will depend to a great extent on enlightened city management. One of the directions in which one may hope to see an improvement is that of raising the status of the permanent city official. Town management in the future should be one of the great professions, requiring a training in economics, civil welfare, town planning, and social work of every description. The position of town manager, and that of assistants in the town management, should be coveted by men of high attainments and great skill. By this means the whole tone of local self-government would be raised. The war has certainly imbued the country with a higher conception of office and duty, and the unrecognised strenuous civic work that has been done throughout all the municipalities of the country during the war cannot possibly be exaggerated. A new spirit has entered into civic life, and no one who has come into close contact with the cities and towns of this country during the last year or two can fail to have felt that an atmosphere has been created that must prove to be permanently beneficial.

The responsibilities of the industrial capitalists after the war will be onerous. Upon them to a large extent rests the power to maintain the industrial peace, but this aspect of the question is rather outside the range of this inquiry.

But I believe it is in the direction of delegating to the fourth class the individual groups in the community, greater power and responsibilities, that there lies the greatest hope for our towns in the future. The policy of trusting the people to manage their own affairs can and should be extended wherever it is possible to do so.

If the policy of housing by employers of labour is adopted, it is essential that labour should have a full share in the responsibility of town management. Such communities must be really self-governing units, not controlled by the capitalist, by the municipality, or by the Central Government.

We are a self-governing race. We know what we want. We can reduce the *desiderata* to a simple formula. We want to increase the sum total of our home-grown food supply. We want a larger proportion of our population to be living under better physical conditions. Is it in our power by any possible courses of action to help towards this end? We know that artificial methods are useless, and that if we desire a permanent change of conditions we must work by the gradual modification of the causes which have led to the evils we deplore. Are there any practical steps that can be taken to reverse the tendencies to agglomeration—to attract the people out into healthy surroundings, and to keep them there? If we can do this we shall have done something towards securing both our aims. It must certainly have the effect of increasing our food supplies, and will mitigate the evils which have hitherto been inseparable from industrialism.

A strange discovery has been made in Rochester Cathedral, where the supposed fine example of old-time wood-carvers' art in the decorative work of the famous Chapter House door has been found to be counterfeit, being a casting in solid lead, cleverly inserted in the panels.

Correspondence.

ST. JOHN'S COLLEGE, CAMBRIDGE.

To the Editor of the BUILDING NEWS.

Sir,—Referring to the BUILDING NEWS of the 10th inst., the illustrations of St. John's College, Cambridge, and the short history of this grand building are somewhat interesting to me, inasmuch as my father carried out the work of the new building under the contractors, Messrs. Bennett and Sons, of Preston, Lancs., commencing the work in 1825.

It may be also of incidental interest to your readers to know that the foundations in the River Cam are built upon driven wooden piles, there being over 2,000,000 of London bricks laid in cement below the water level. Evidently this kind of foundation is satisfactory. I think I have in my possession a few sketches of interior work in connection with this building.

Yours faithfully,

A. WINDER.

Parker, Winder, and Achurch, Ltd., Hardware Merchants and Manufacturers, Broad Street, Birmingham.

ALL HALLOWS CHURCH, BARKING.

Sir,—I notice that in your account of All Hallows Church, Barking, in your issue of January 3 you take exception to the battlemented parapet with balls at the corners, shown on the drawing of the tower, which you publish.

When the plans for the restoration were being prepared by my father, an early 18th century print was found, I think, in the British Museum—of which I have a sketch by me—showing the Cromwellian Tower with this identical parapet. This was, of course, sufficient authority for my father's drawing.

A close examination of the existing parapet would, I think, also show that it is not coeval with the rest of the tower.

FRANK L. PEARSON.

22, Ashley Place, Westminster,
London, S.W.
January 11, 1917.

Building Intelligence.

TETUAN.

Tenders will be received up to 16th February at the Secretariat of the "Junta de Servicios Locales," Tetuan, or in the Morocco section of the Ministry of State at Madrid, for the construction of a market in Tetuan at an estimated cost of 175,000 pesetas (about £7,000 at par). The market building is to be erected on a site in the old grain market, and on the portions of the area not occupied by the market place other buildings are to be erected. The market place, which is to be built in the Moorish style of architecture, must be covered in, and from 100 to 110 compartments must be provided, ranging in size from 4 to 8 square metres, all having marble or artificial stone counters, and the walls faced with white stones or tiles up to a height of 2½ to 3 metres. The floor is to be of cement grooved tiles, and the drain pipes of stoneware. A preliminary deposit of 1,000 pesetas (about £40 at par) is required to qualify each tender. The specification, plans, etc., may be inspected at either of the above-mentioned offices.

TRADE NOTES.

Bell's United Asbestos Co., Ltd., have recently laid "Decolite" fire-resisting floors at the Scala Theatre, Tottenham Court Road, W.C.

Boyle's latest patent "air-pump" ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, E.C., have been employed by Messrs. W. T. Henley's Telegraph Works Company, Ltd., North Woolwich.

Sanction was given at the Surrey County Council meeting last week to the erection of a memorial to the late Mr. A. G. Vanderbilt at a point 60 ft. from the centre of the road at Holmwood Common, which he frequently used when coaching to Brighton.

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PROFESSIONAL AND TRADE SOCIETIES.

Architectural Association of Ireland.

Mr. G. H. Leask, president, occupied the chair at a meeting of the Architectural Association of Ireland, held in the Association's Rooms, South Frederick Lane, last week, when Mr. G. Atkinson, R.H.A., delivered a lecture on "British Furniture Style." Mr. Atkinson, whose lecture was profusely illustrated with limelight views, confined his lecture to the development of the chair in the century 1660-1760, a period when English furniture was at its highest from the artistic view of the designer. He traced the changes due to social and domestic influences, as well as the influence exercised by famous architects. Not the least interesting portion of Mr. Atkinson's lecture was his reference to the development of the work of Chippendale.

MANCHESTER SOCIETY OF ARCHITECTS.—The president, Mr. John B. Gass, F.R.I.B.A., of Bolton, delivered a lecture to the members at the society's rooms on Wednesday, January 10, on "Greece and Some of the Islands in the Ægean Sea." The lecture was illustrated by about sixty water-colour sketches by Mr. Gass, made during his visits to the Near East, and gave added interest to the places described, and the architectural remains of the golden age of Greece. The islands of the Grecian Archipelago seem the stepping-stones from the further East of that wonderful civilisation of Greece which so greatly influences our modern times. The interests of Greek travel are not of the things of to-day, but of the conditions and progress of a wonderful people over 2,000 years ago, and whose greatness has departed. Mykenæ, destroyed in the fifth century B.C., was in its architecture a late offshoot from Minoan Crete. Epidauros, the great open-air cure establishment, like the Sanatoris of to-day with the temple of Asclepuis, and the open-air theatre for 16,000 spectators still in good preservation, Olympia, and the many architectural glories of Athens were well illustrated and described; Delos, the sacred isle of the Greek confederation and the birthplace of Apollo, now uninhabited, but the old city has recently been excavated by the French, and is of great interest. The Venus of Milo, one of the great treasures of the Louvre at Paris, was discovered at Melos, and further excavations were being made by the British School at Athens. The harbour is an extinct volcano, while Santorin is an inhabited, sun-baked, sulphurous lava and ash-heap, rising out of the sea and surrounding the mouth of a crater, into which the ships sail, and there is still volcanic activity from its depths. Samos has home rule, and is one of the most prosperous of the islands with some interesting architectural remains, and Patmos contains the cave in which the Book of Revelations was written, and many early manuscripts. Other places were illustrated, and sketches in the Dardanelles, Constantinople, and Smyrna proved of considerable interest.

NATIONAL FEDERATION OF BUILDING TRADES EMPLOYERS.—The annual meeting of the Midland Centre of the National Federation of Building Trades' employers of Great Britain and Ireland was held in Birmingham last Thursday, under the presidency of Mr. F. D. Doleman, of Nottingham. The report stated that there had been no improvement in the condition of the building trade during the past twelve months. Apart from the erection, or extension of factories, or workshops required for war work in two or three towns, there had been very little activity in the industry. The abnormal conditions in regard to labour and materials had continued, and there seemed to be no prospect of improvement in the trade until the war was over. With the object of preventing the building trade being brought to a standstill efforts had been made to secure a modification of the Order under the Defence of the Realm Regulations prohibiting the carrying out of any building work involving the use of steel or iron, or any other work amounting to more than £500. The question was discussed by the Executive Council, and the Federation, in December, when it was decided that an offer should be made to co-operate (in conjunction with the operations) with the Government, with a view to securing greater efficiency in the execution of constructional work and other matters. The report recorded the work accomplished during the year in respect to labour disputes, and the granting of war bonuses, and mentioned that the number of associations affiliated to the Centre was 23, the Birmingham Association returning 279 members. The estimated balance in hand was £84, as compared with £94 at the close of the previous year. The meeting approved the report, and the officers were elected for the ensuing year, Mr. C. Garlick (Coventry) being appointetd president.

LEGAL INTELLIGENCE.

PUBLIC INTERESTS AND PRIVATE MOTIVES.—THE KING v. HAMPSTEAD BOROUGH COUNCIL.—(Before the Lord Chief Justice and Justices Ridley and Lush.)—In this matter the court considered a case which raised the question of the right of Alderman William Woodward, F.R.I.B.A., a member of the Hampstead Borough Council, to inspection of certain documents. Cause was shown against a rule nisi for a mandamus being issued to the borough council directing that Mr. Woodward should be given access to inspect a report by the Medical Officer of Health in reference to 83, Palmerston Road, and a copy of the observation of the Health Committee to the Local Government Board, and that he should be allowed to take copies of the same, on the ground that they related to matters of public importance in the administration of the business of the council. It appeared from the affidavit of Mr. Woodward that the council in June, 1911, on the recommendation of the Public Health Committee, made a closing order in respect of the house in question under the Housing and Town Planning Act. Mr. Woodward came to the conclusion that the premises were in no sense unfit for human habitation, and that the action of the council was mistaken. An order was made for the demolition of the premises, and at a Local Government Board Inquiry the whole of the medical officer's report was not produced. The Local Government Board finally confirmed the order for demolition. Mr. Woodward said it was not his desire or intention to make use of the information in the documents pending litigation by the owner of the house. The Town Clerk of Hampstead denied, in an affidavit, that any facts on evidence with regard to the condition of the dwelling-house that were at the disposal of the council were not laid before the inspector at the inquiry.—The Lord Chief Justice, giving judgment on Monday, said the question involved was only a question of fact, there being no difference of opinion with regard to the principle of law to be applied. When Mr. Woodward wanted inspection of the documents the town clerk refused on the grounds that Mr. Woodward had given evidence in proceedings which were being taken by Mr. Arlidge, the owner of the property, against the borough council with respect to the order which had been made, and that at the inquiry which had been held he gave evidence. Prima facie Mr. Woodward had a common law right to the prduction of the documents. The general principle was not contested, but it was contended that in the special circumstances of this case the court, in the exercise of its discretion, should refuse to make the rule absolute, on the ground that Mr. Woodward was not solely actuated by his public position, but was actuated by the indirect motive of assisting Mr. Arlidge. He had no hesitation in coming to the conclusion that Mr. Woodward's proceedings were not dictated solely by public interests, and not actuated solely by the desire to raise the point as to the proceedings before the committee and the desirability of the council taking these matters into their own hands. He did not wish it to be thought that Mr. Woodward had in any way wilfully misled the court; he thought Mr. Woodward, almost unknown to himself, had desired to help Mr. Arlidge, and with that motive had sought to get information from the two documents.—The rule was discharged.

VICAR'S CURIOUS CLAIM.—CABLES AND CHURCHYARDS.—At the first public sitting of the War Losses Commission for awarding compensation in respect of property taken by Government under the Defence of the Realm regulations, the Rev. J. Dixon, of the Vicarage, Willesden, asked for the repayment of professional charges incurred in negotiations with the North Metropolitan Electric Light Company and the Ministry of Munitions in connection with the laying of an electric cable through consecrated ground, which he considered was an outrage against religious feelings.—Mr. Wright, representing his legal advisers, said that Mr. Dixon had no authority to permit anybody to use any part of the churchyard, and was therefore unable to consent to the laying of the cable. He pointed out to the company two alternative routes—one along the street, about four times the length of the churchyard route, and the second along the railway embankment. It was also pointed out that the chancellor might see his way to grant a faculty. Ultimately the cable was laid under powers given by the Defence of the Realm Act, and Mr. Dixon, who had incurred £11 costs, asked for nine guineas compensation.—The Chairman said that he understood that the lighting company were required for military purposes to lay a cable, and the most direct way, except by incurring very considerable expense, was to lay it under the pathway in the churchyard. The rector objected, communicated with the local officials, and alternative routes were suggested to avoid consecrated ground. Obvious objections to those alternative routes were pointed out by the engineers, and ultimately it came to a question that they were informed that the outrage which it was said would take place if the churchyard path was used would be assuaged by the payment of £200 to church funds and 30 guineas for the expenses of a faculty. This was described as "blackmail," and they refused to pay, with the result that the military authorities exercised their powers and put the cable through the churchyard. The refusal of the vicar to give his consent occasioned the bill of costs.—Mr. Wright: Not quite that. He had no power to consent.—The Chairman: How is it he offered to take £200?—Mr. Wright: What he said was that if the company were doing the thing on their own responsibility it was a question of their saving £300 or £400 by taking the cable through the churchyard, but that they should not go through consecrated ground unless the Court consented, and that it should not be done for the purpose of making a profit for a commercial company. Mr. Wright added that the vicar was offered £30 in addition to his expenses.—The Chairman: He was a foolish man not to take it. It was a question of how much. The outrage to religious feelings would disappear if you got enough money.—Mr. Wright dissented.—The Chairman: Well, listen to your own letter. "If, however, the company is prepared to increase its offer from £30 to £200, and in any case agree to pay costs and the expenses, including this application for a faculty, whether such application be successful or not, he and his churchwardens will apply for such a faculty."—Mr. Wright: We took rather the patriotic view.—The Chairman: The less we say about patriotism in this matter the better.—Intimating that the Commission would communicate its decision, the Chairman said: "I think you may say that the Commission take a very strong view about this application."

Our Office Table.

The new one-pound notes are to have on the back a picture of the Houses of Parliament. A cynical correspondent suggests that, instead of trying to popularise a discredited institution, the space would have been better filled by a little advice on how to make the new pound go as far as ten shillings went before the war. We do not grumble at having to carry about the home of the mother of Parliaments, though, perhaps, a few tasty recipes for meatless days, or a reminder that sardines count as a course, would have been more appropriate to the mood of the hour.

The annual report of the Employers' Parliamentary Association sounds an optimistic note as regards the future. It cannot be forgotten, it says, that great wars in the past have often heralded the dawn of a period of industrial and commercial prosperity. The American Civil War was followed by an unprecedented rise to industrial eminence of that country. The war of 1870-71 has been utilised by Germany as a stepping-stone to a great industrial position. Signs are not wanting that an industrial regenerative spirit is operating in more than one of the Allied belligerents. The committee are confident that peace will offer great opportunities for industrial and commercial advancement for the Empire. "The resources of the Empire are unrivalled. The cessation of hostilities will, and must, bring about the more thorough development of these resources. There

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must be no narrow, insular view taken of the future. This country must think in terms of Empire, and not of the United Kingdom. Our overseas possessions are ready to act with us in peace, as they have supported us so nobly during war. The committee, in making these observations, preserve a neutral attitude with respect to past fiscal controversies; they desire only to reiterate their oft-repeated assertion that the only way to secure the consummation of these ideals is to organise the producers as a whole."

The Welton Rural District Council at Lincoln, on Friday week, considered a report from the Highways Committee with reference to the calling up for military service of the surveyor (Mr. Starkie). The committee recommended that the district councillor for each parish be authorised to supervise the repairs of the highways in his district, together with the manual and team labour thereon. Mr. H. Sargeant thought it was too much to ask each councillor to overlook his parish, and proposed as an amendment that a temporary surveyor be appointed. This was seconded by Mr. H. P. Stamp. A lengthy discussion followed the amendment, in the end being carried by thirteen votes to six. It was agreed to advertise at a salary of £100, leaving over the question of making up the salary of Mr. Starkie (£140 a year).

Dr. J. Walter Tewkes has issued a pamphlet reporting the progress made in the excavation and repair of the Sun Temple at Mesa Verde National Park. The monument was discovered by Dr. Tewkes in 1909, and since then work has steadily gone on in order to excavate and repair this interesting building. The pamphlet issued by Dr. Tewkes contains a full account of the building, with a ground plan, measurements, and photographs, which make it now possible to understand the character and purpose of this remarkable structure.

At the Guildhall Art Gallery last Friday, the Lord Mayor presiding, a meeting organised by the Royal Drawing Society was held to consider the future of drawing as an essential in science development. The Society, on the invitation of Mr. Arthur Henderson, when President of the Board of Education, submitted information concerning the connexion of its work with the teaching of science to the Committee on the Teaching of Science appointed by Mr. Asquith. The memorandum drawn up has been approved by Queen Alexandra, who fully appreciates the value of the system which the Council of the Society adopt in training the young to draw from memory after observation. Drawing, it is pointed out, is a valuable, and often an absolutely necessary, means of making observations, and the process of drawing also forces the observer to consider structural relations and meanings.

The seventh exhibition of the Senefelder Club for the advancement of artistic lithography, of which Mr. Joseph Pennell is President, will be opened on Saturday, 20th inst., at the Leicester Galleries, Leicester Square. A special feature of the forthcoming exhibition will be the collection of lithographs by distinguished French artists, which will be shown together with those of the best living English exponents. Daumier, Gavarni, Delacroix, Forsain, Steinlen, Corot, Carrière, Lepère, Legros, Rops, Fantin-Latour, Puvis de Chavannes, Renoir, Toulouse-Lautrec, and Willette will all be well represented in the coming building.

The danger of British insurance offices insuring a portion of their risks with German firms, as was the practice before the war, was emphasised last week by Mr. W. Powell, late British Consul at Philadelphia, in an address to the Royal Colonial Institute. Especially was this dangerous with regard to fire insurance (he said), as the premium rate for this class of insurance was low, and large inducements were held out by the German insurance companies to the English firms for this class of business. Thus the German companies obtained full details of the buildings and factories situated all over the United Kingdom, giving a splendid opportunity to the German Government for obtaining the situation and resources of our manufactories with a view to their destruction by spies or aircraft.

At the sitting of the Ilkley Tribunal, last week, a contractor, engaged on the extension of the sanatorium at Middleton, near Ilkley, who had been granted several periods of temporary exemption to finish the work, applied for a further extension. He produced a letter from the architect, stating that it would take five months to finish the building. One of the members pointed out that in June last, when a period of exemption was asked for by the applicant, it was stated that the work would take six months to finish. The applicant stated that he had been held back by other trades, and that men had left him because they could get better wages elsewhere. It was pointed out that it was incumbent upon him to proceed with the work, and that he ought not to allow men to leave him on account of wages. He was granted a further period of exemption up to February 28, with an intimation that this was final.

The rule of the past has been to send several men with ropes to facilitate the raising of ladders to reach roofs and gutters, but the scarcity of men now demands the use of improved ladders, which builders and decorators have been extremely slow to adopt. However, the time has come to enforce adoption, and the Heathman telescopic ladders deserve greater attention than they have received. A 45-ft. ladder can be raised and extended by one man and adjusted to intermediate heights from 17 ft. upwards, and, if anything, it is stronger than the one-piece ladder. Mr. Heathman has opened a new showroom at 35, Aldersgate Street, near the General Post Office, for visitors who cannot journey to his factory at Parsons Green, Fulham, and he anticipates better adoption of his many improvements by tradesmen.

At the annual meeting of the members of the Property Owners' Protection Association, which will be held at the Cannon Street Hotel on January 25 at 5.30 p.m., the chair will be occupied by Alderman and Sheriff Louis A. Newton. On the conclusion of the business of the annual meeting, probably by 6 o'clock, a general public meeting will be held, at which addresses will be delivered by the following speakers:—Messrs. James Boyton, M.P., Edwin Evans, L.C.C. (President of the Association), M. Cheverton-Brown, C.C., and A. W. Shelton. The Lord Mayor (Sir William Dunn) and the Sheriffs will receive the delegates from the National Federation of Property Owners and Ratepayers and the members of the Council of the Association at the Mansion House prior to the annual meeting.

The shortage of houses is rapidly becoming acute in Bristol. Private enterprise has ceased to build houses for the working classes. In two districts with 1,198 houses and with a population of 5,618, a census revealed the fact that there were only two houses void, and both of them were unrepairable. It is regrettable that necessary repairs in many cases have been neglected. The old proverb "A stitch in time saves nine" applies to houses. The failure to make good a few defective bricks, to rebuild a quoin, results in back additions collapsing, and a considerable outlay is involved in rebuilding. The year has been marked by the number of cases of complaints of annexes falling down, collapse of roofs, etc. Investigation proves that timely attention would have saved matters if the slight repairs required in the first place had been attended to. Much work has been done without notices being served.

There was a large attendance of workers in the building and allied trades of Leeds at a mass meeting held in the Lees Hall, Vicar Lane, last Wednesday, to formulate a demand for increased wages. The subject was fully discussed, and eventually it was unanimously resolved "That this meeting of the building and allied trades of Leeds, in view of the abnormal increase in the cost of living, hereby makes application for an increase of 2d. an hour, and that the terms of the resolution be sent to Mr. John Hodge, the Labour Minister, and to Mr. Neville Chamberlain.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C., and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

***Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.

Telephone: Gerrard 1291.
Telegrams: "Timeserver, Estrand, London."

NOTICE.

Bound Copies of Vol. CX. are now ready, and should be ordered early (price 12s. each, by post 12s. 10d.), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XLI., XLVI., XLIX., LIII., LXI., LXII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXXI., LXXII., LXXIII., LXXIV., LXXV., LXXVI., LXXVII., LXXIX., LXXX., LXXXI., LXXXII., LXXXIII., LXXXIV., LXXXV., LXXXVI., LXXXVII., LXXXVIII., LXXXIX., XC., XCI., XCII., XCIII., XCIV., XCV., XCVI., XCVII., XCVIII., XCIX., C., CI., CII., CIII., CIV., CV., CVI., CVII., CVIII., and CIX., may still be obtained at the same price; all the other bound volumes are out of print.

BACK ISSUES.

Most of the back issues are to be had singly. All back issues over one month old will be charged 6d. each, postage 1d. Subscribers requiring back numbers should order at once, as they soon run out of print.

Handsome Cloth Cases for binding the BUILDING NEWS, price 2s., post free 2s. 5d., can be obtained from any Newsagent, or from the Publisher, Effingham House, 1, Arundel Street, Strand, W.C.

RECEIVED. T. W. H.,—C. P. and Co.—O. and Co.—S. W. F. and Co., Ltd.—J. O. and Son, Ltd.—C. J. and Co.—Lt. B. L.—B. Bros. and Sons, Ltd.—K. C. F. Co.—L. L. K.—P. C. B. and Co.

T. R. L.—No.

A. K.—Many thanks.

F. J.—Kindly send. 2. Yes, if possible.

A. W. L.—We do not know if the firm still exists.

T. T.—We do not agree with you. Science and art are not two complementary things, appealing to quite different intellectual faculties. They are one and the same, and both are products of the creative imagination. It is for this reason that science really consists in the scientific theory, and not in the discovery and tabulation of "Laws of Nature," still less in utilitarian applications, which, however beneficial or harmful they may be, are merely the by-products of science. The scientist dreams, and creates a universe from his dreams. He is concerned with truth, it is true, but so is every artist. Keats thought truth and beauty were one, but, at any rate, it is certain that, in the words of the late Henri Poincaré: There is a profound connection between the truth and the beauty of a scientific theory.

Steady progress is being made with the construction of the Standard shipyard at Chepstow. Two slips are being prepared for ships of 3,000 tons. Fifteen houses are in course of erection by Messrs. Falkner, of London, who will also put up workshops for the company.

A letter was read at a meeting of the Hull City Council last Thursday from Mr. T. R. Ferens, M.P. for East Hull, intimating that he will convey the deeds of the site of St. John's Church, which he had purchased, to the city, and will transfer shares, which at present rates are worth £35,000, for the erection of an art gallery worthy of the city on the site in Victoria Square.

A well-known Worcestershire builder, Mr. John Howard, of Park Lane, Kidderminster, went to the top of the tower of his residence last week and got out on to the roof. He fell to the ground a considerable distance and was killed. Mr. Howard, who was 69 years of age, was a native of Kidderminster, and had been extensively employed as a builder. He spent many years in the Worcestershire Yeomanry, and when he retired some years ago he was allowed to wear his sword.

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TO ARMS!

1st LONDON ENGINEER VOLUNTEERS.

Headquarters, Balderton Street, Oxford Street, W.

ORDERS FOR THE WEEK, BY LIEUT.-COL. C. B. CLAY, V.D., COMMANDING.

OFFICER FOR THE WEEK.—Platoon Commander H. de P. Birkett.

NEXT FOR DUTY.—Platoon Commander G. H. Parker.

MONDAY, January 22.—Technical for Platoon No. 9 at Regency Street. Squad and Platoon Drill, Platoon No. 10. Signalling Class. Recruits Drill, 6.25—8.

TUESDAY, January 23.—School of Arms, 6—7. Lecture, 7.15, "Musketry." By the Instructor of Musketry.

WEDNESDAY, January 24.—Instructional Class, 6.15. Platoon Drill, Platoon No. 2.

THURSDAY, January 25.—Platoon Drill, Platoon No. 7. Ambulance Class by M.O., 6.30.

FRIDAY, January 26.—Technical for Platoon No. 10, Regency Street. Squad and Platoon Drill, No. 9. Signalling Class. Recruits Drill, 6.25—8.25.

SATURDAY, January 27.—N.C.O.'s Class, 2.30, by Coy.-Cdr. E. G. Fleming.

SUNDAY, January 28.—Entrenching at Otford, Parade Victoria (S.E. and C. Rly. Booking Office), 8.45 a.m. Uniform, haversacks, water-bottles. Midday rations to be carried. Railway vouchers will be provided.

MUSKETRY.—For all Companies, see Notice at Headquarters.

NOTE.—Unless otherwise indicated, all Drills, etc., will take place at headquarters.

The Orders are liable to slight alteration.

By order,

MACLEOD YEARSLEY, Adjutant.

January 20, 1917.

Mr. Thomas H. Pilkington, who for many years acted as assistant county surveyor to the Clare County Council, has just died.

Lieutenant Wallis Coales, R.E., son of Mr. Herbert G. Coales, engineer and surveyor to the Market Harborough Urban District Council, has been awarded the Military Cross.

During the absence of all the partners of the firm of Messrs. Pine-Coffin, Imre, and Angell, who are serving with H.M. Forces, Mr. Charles J. Ford has kindly consented to attend to their business at 4, Mitre Court, Fleet Street.

The death, on December 27, at Madras, is announced of Mr. Ernest Montague Thomas, F.R.I.B.A., who was consulting architect to the Government of Madras, youngest son of the late Edward Thomas and brother of Sir A. Brumwell Thomas, of London, architect.

Severe criticisms of the plans of the new Star and Garter Homes at Richmond were made at the Town Council last Wednesday. Members said they were promised a beautiful building in the Italian style, whereas the proposed structure resembled a barracks. The plans were referred back for consultation with the architect.

A cable received in London by the High Commissioner for Australia says that the New South Wales Government has endowed a Chair of Architecture at the Sydney University for £2,000 annually. It is claimed that this is the first occasion that a Government of the British Empire has recognised the national importance of architecture.

At a meeting of the Ripon Diocesan Conference at Bradford last Thursday a scheme was adopted for the formation of a new See of Bradford, consisting of the Deanery of Bradford, the four Craven Deaneries, and the Deanery of Clapham, which are all now in the diocese of Ripon. A minimum income of £2,500 and a house costing £70,000 will be required.

A new mace has been presented to the House of Commons of the Dominion of Canada to take the place of the one destroyed in the fire of February 17, 1916. The donors are Colonel Sir C. C. Wakefield, ex-Lord Mayor of London, and the Sheriffs, Alderman G. A. Touche, M.P., and Mr. S. G. Shead. The general design of the mace is on similar lines to that used in the British House of Commons. The vase-shaped head is divided into four panels by female figures with acanthus leaf terminals. These panels contain the following embossed emblems:—The Arms of the Dominion of Canada, the Rose for England, the Harp for Ireland, and the Thistle for Scotland; above each emblem is the Royal Crown, and the initials G.R. are placed on either side. The mace is the work of the Goldsmiths and Silversmiths Company, Ltd., of Regent Street, London

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TENDERS.

***** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.**

BATTERSEA, S.W.—For removal of ashes from the Latchmere Road baths (One Year), for the borough council:—

Ive, J. .. .. 9s. per load.
(Recommended for acceptance.)

BROADSTAIRS.—For demolition of 1-2, Leslie Cottages, for the urban district council:—

Fuggle, G. H.	£46 0 0
Martin, W. W.	42 8 6
Dunn, E. (accepted)	34 16 0

NEWPORT, I.W.—For supply of 400 tons of granite, 1½-in. gauge, and 100 tons of ¾-in. granite chippings, delivered upon the Town Quay, for the corporation:—

Rowe and Mitchell, granite 18s. 9d. per ton, chippings 18s. 9d. per ton, inclusive of freight and delivery rate of 9s. per ton.

Brookes, Ltd., Westminster, £1 0s. 4d. and £1 0s. 4d., inclusive of freight and delivery rate of 10s. per ton.

PORTSMOUTH.—Supply of spare fittings, etc., for the drainage committee of the corporation:—

Davis, H. and W., Ltd.	£87 0 0
Vosper and Co., Ltd.	81 0 0
Wilkes and Co., Ltd.	76 15 0
McKinlay and Co., Ltd.	76 0 0
Shervell, J., Ltd.*	72 10 0

(*Accepted.)

SKIPTON.—For rebuilding walls at Glusburn, for the Skipton Rural District Council:—

Whittaker, W., Cowling (accepted).

SOUTH SHIELDS.—For heating and ventilation of Court Buildings and Fire Brigade Station, for the corporation:—

Grey, G., South Shields (boiler and flue (accepted)	£69 13 0
Emley and Sons (heating fire station) (accepted)	42 0 0

WORCESTER.—For planting trees, etc., at the pig market, for the Markets Committee:—

Parsons, E. J., 18, St. Nicholas Street, £30
(Accepted.)

COMPETITIONS OPEN.

March 3.—Water Supply and Sewerage Scheme (premium 5,000 pesetas—about £200), Manzanares, Spain.—Secretaria del Ayuntamiento, Manzanares.

LIST OF TENDERS OPEN.

BUILDINGS.

Jan. 20.—Cottage in the grounds of new infirmary building at Eye.—For the Hartismere Board of Guardians.—H. Warnes, Clerk, Union Offices, Victoria Road, Eye.

Jan. 22.—Pulling down and clearing away old chapel premises and two adjoining houses, situate in Kent Street, Nottingham.—City Architect's Department, Guildhall, Nottingham.

Jan. 23.—Engine Room at Refuse Destructor, Suffolk Road, Ilford.—For the Urban District Council.—A. Partington, Clerk, Town Hall, Ilford.

ENGINEERING.

Jan. 21.—Laying of about 1,200 yards of 4-in. mains and subsidiary works at Pembrey and Pontardulais.—For the Llanelly Rural District Council.—D. A. Howell, A.M.I.C.E., Water Engineer, Cowell Street, Llanelly.

Jan. 24.—One Five-ton Steam Tractor and Four Six-ton Trailers, delivered at Joyce Green Hospital, Dartford, Kent.—For the Metropolitan Asylums Board.—D. Mann, Clerk, Board Offices, Embankment, E.C.

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

FENCES AND WALLS.

Jan. 18.—About 2,000 ft. run of British Oak Planking, 3½ by 6 ins., delivered at Dymchurch by June 1, 1917.—For the Romney Marsh Level.—The Bailiff, New Hall, Dymchurch.

Jan. 22.—Fencing, Manchester.—Supply and erection of fencing and gates for allotments at French Barn Lane, Blackley, and Charlestown Road, Moston; also for allotments at Princess Road South, Moss Side, and Demesne Road, Fallowfield.—For the Small Holdings and Allotments Committee.—Chairman of the Small Holdings and Allotments Committee, Manchester.

March 30.—Wrought-iron Gates and Fencing, for the Central Wharf and Quay Street Landing, Auckland, N.Z.—For the Harbour Board.—The Commercial Intelligence Department, 73, Basinghall Street, E.C.

PAINTING.

Jan. 27—Feb. 1.—Painting, cleaning, etc., to the laundry and engine-house at the Newington Institution, Westmoreland Road, S.E.—For the Southwark Board of Guardians.—S. Wood, Clerk, Guardians Offices, Ufford Street, Blackfriars, S.E.

Feb. 7.—For Painting at various places.—For the Lancashire and Yorkshire Railway Company.—R. C. Irwin, Secretary, Hunt's Bank, Manchester.

ROADS AND STREETS.

Jan. 20.—Tarspraying main roads during 1917.—For the Essex County Council.—P. J. Sheldon, County Surveyor, Chelmsford.

Jan. 21.—Broken granite to the various stations in district.—For the Midhurst Rural District Council.—A. G. Gibbs, Surveyor, Council Offices, Midhurst.

Jan. 22.—Granite and Slag for Roads and Gravel for Paths in Sleaford District (one year).—For the Sleaford Rural District Council.—E. H. Godson, Clerk, 27, Northgate, Sleaford.

Jan. 24.—For Granite, Basalt, Limestone, and Tar Macadam (one year), Railway Stations and Wharves in Dorset.—For the County Council.—E. H. Habgood, Acting County Surveyor, County Offices, Dorchester.

Jan. 27.—2 in. and ½ in. Tarred Slag; 2 in. and ½ in. Dry Slag; 2 in., ½ in., and ¼ in. Granite; 2 in., ½ in., and ¼ in. Limestone, Stratford-upon-Avon.—For the Corporation.—F. W. Jones, A.M.I.C.E., Borough Surveyor, Town Hall, Stratford-upon-Avon.

Jan. 29.—British Macadam, West End, Hants.—For the South Stoneham Rural District Council.—Mr. E. Wynter Cross, Clerk, West End, Hants.

Jan. 30.—Whinstone (broken and unbroken) and limestone and also tarred slag and whinstone for macadamizing purposes (One Year) in such quantities as surveyor shall from time to time direct.—For the Middlesbrough Rural District Council—W. Richardson, Clerk for highway purposes, Stokesley.

Jan. 31.—Broken Stone, Chippings, and Tarred Macadam (One Year).—For the Neston and Parkgate Urban District Council.—Surveyor, Town Hall, Neston

Jan. 31.—Setts, Kerbs, and Flags, Granite Macadam, Pitch and Tar, Slag Dust, Tar-Macadam, Limestone Macadam, Brushes (One Year).—For the Otley Urban District Council.—O. Holmes, Surveyor to the Council.

Feb. 7.—7,500 tons (more or less) of 2-in. and 1½-in. hand-broken basalt for road construction, and 500 tons (more or less) of ¾-in. clean chippings, to be delivered from the various stations in Middlesex.—For the Middlesex County Council.—Clerk, County Council, Middlesex Guildhall, Westminster

SANITARY.

Jan. 22.—Collection, Removal, and Disposal of House Refuse, Northwich (One Year).—For the Urban District Council.—J. A. Cowley, Clerk, Council House, Northwich.

Jan. 26.—Scavenging.—For the Sedgefield Rural District Council.—J. W. Lodge, Clerk, Council Offices, Sedgefield, Ferryhill.

Feb. 6.—Emptying and Removing Contents of Ashpits, etc., and Removal of House Refuse (One, Two, or Three Years), Old Hill, Staffs.—D. Wright, Clerk, Council House, Old Hill.

STEEL AND IRON.

Jan. 31.—Mild Steel or Iron Gates and Fencing for Quay Street Frontage, Auckland, N.Z.—For the Harbour Board.—Messrs. W. and A. McArthur, Ltd., Canberra House, 18-19, Silk Street, Cripplegate, E.C.

STORES.

Jan. 20.—Granite, Blast Furnace Slag, and Tar Macadam (One Year). Worcester.—For the County Council.—C. F. Gettings, County Surveyor, 30, Foregate Street, Worcester.

Jan. 20.—Broken Granite or Basalt for Main Roads (One Year), Long Ashton Division, Bristol.—For the Somerset County Council.—G. R. Folland, Acting County Surveyor, Wells, Somerset.

Jan. 20.—Materials and Team Labour.—For the Essex County Council.—County Surveyor's Office, Chelmsford.

Jan. 20.—Flints, Gravel, Chalk, Team Labour, Tools, Barrows, Handcarts, etc. (one year).—For the Norfolk County Council.—Clerk to the Council, Shirehouse, Norwich.

Jan. 21.—Broken Granite, Midhurst.—For the Rural District Council.—A. G. Gibbs, Surveyor, Council Offices, Midhurst.

Jan. 27.—Sanitary pipes, etc. (One Year).—For the Bishop Auckland Urban District Council.—J. T. Proud, Clerk, Town Hall Buildings, Bishop Auckland.

Feb. 1.—Annealed Scoriæ (broken); bricks, castings; concrete flags and kerbs; Portland cement, pitch and tar; sanitary pipes, gullies, junctions, etc.; slag (broken); coal (for domestic use only), coke; timber; whinstone and granite (broken); and whinstone and granite setts and kerbs.—For the Middlesbrough Corporation.—P. Kitchen, Town Clerk, Municipal Buildings, Middlesbrough.

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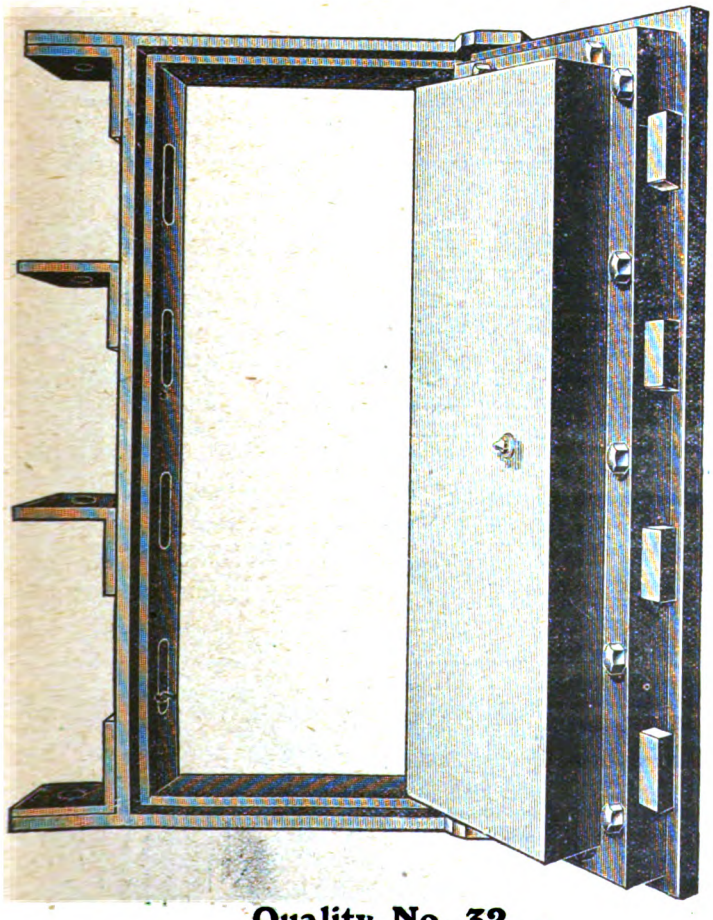

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January 24, 1917. Volume CXII.—No. 3238.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.

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OUR ILLUSTRATIONS.

An Octagonal House at Caldy, Cheshire. View of hall, billiard-room, and staircase, the front entrance, and sheet of plans and sections. Messrs. Briggs, Wolstenholme, and Thornely, F.F.R.I.B.A., Architects.

Examples of Italian Architecture and Decorations illustrating paper by Mr. Ivor Beaumont. Singing gallery by Luca della Robbia, Museum of Santa Maria del Fiore, Florence; vaulting, Siena Cathedral; vaulting, Vatican Palace, Rome-Sala Ducale; detail of the façade, The Duomo, Florence, and other illustrations, with the text wall decoration, Avena Chapel, Padua, by Gio Ho; Twelfth Century Doorway, Church of St. Guist, and ceiling decoration by Pinurrichio-Libreria Piccolomini, Siena Cathedral.

General Headquarters Troops' Exhibition of Art, Grand Prix Diploma Sketches in French Flanders, by Lance-Corp. A. E. Poley, Silver Medallist, R.I.B.A. Towers, Hotel de Ville, Hesden; St. Sepulchre, St. Denis, and the Abbey of St. Bertin at St. Omer.

Currente Calamo.

The terrible explosion in East London, and those which have preceded it elsewhere, are heavy penalties to pay for the use of buildings for munition-making which are in many respects unsuitable, and in dangerous proximity to adjacent life and property. For the most part, before the war, such factories were remote from towns and thickly populated districts. So are those put up during the last three years; and, however hard put to it the Government may have been, it is hardly consoling to accept pleas of economy or convenience for the retention a day longer than is absolutely necessary of other factories which, any moment, may cover another square half-mile of London with ruins. It is useless to speculate on the immediate cause of the catastrophe till the result of the official inquiry is published, and probably the rumours and reports of enemy agents and their share in the explosion are merely foolish talk. The wonder is that we have not had more explosions all over the country in the absence of stricter enforcement of necessary regulations. While magistrates content themselves with fining people who carry matches into the factories, and when absentees are allowed to defy tribunals, as the 235 navvies did last Friday and Saturday at Birmingham, smoking and boozing and fighting in the court itself, it is hardly likely that discipline—the one safeguard against accidents, can be maintained.

"London Iced" on Monday morning found many thousands reduced to rely on Shanks' pony to reach the scenes of their labours. It was our fate to mark the contrast always presented, but on Monday more so by the condition of the streets controlled by the City and four of the adjacent Metropolitan Boroughs. Throughout the former, on reaching Moorgate, and to the confines of Westminster, the streets, having been cleansed long before passengers were afoot, were safe and passable. In the rest the choice was from skating over the glassy surface of slush in the extreme north of Islington to floundering through the greasy mud of at least a couple of days' accumulation elsewhere. Efficient labour is scarce everywhere, but surely the City does not monopolise all competent organisation and capable superintendence? Thanks thereto, even in the busiest thoroughfares, the City is not left to the late arrival on the scene of the mostly motley crews of the scavenging brigades recruited apparently from the casual wards and other refuges for the lazy. Removal is prompt and thorough, and yet the charges are lighter than in many districts where most of the mud is left to be removed on the boots of wayfarers into the clean streets of the centre of the Metropolis which the City so well administrates in all that concerns sanitation.

All men of business and, perhaps, more especially, those who, in these dark days, are trying to make a living by and about building are sick of the waste of time, trouble and money caused by our various jury methods. Grand juries, which once had a meaning as a protection against the Court for arbitrary action in the way of so called political libel, and the prevention of putting on his trial a man wholly innocent have years ago ceased to be anything but a form and a farce. Magisterial investigation has made them mere useless survivals. In actual Criminal trials the jury will still stand for a full and free hearing, but in Civil causes juries are rarely of any real value; they have never been needed in Chancery, where the most important cases are now decided. On the Common Law side a jury is only wanted where the claim is so doubtful that every sporting chance is a gain. Yet we still see thousands of men dragged from their business or the land to sit as Grand jurors and solemnly follow police advice in finding "true bills"! In the High Court the present sittings will require far over 2,000 men to leave their work and business and hang about or sit listening to counsel's tricky or technical talk, mostly about nothing that matters to anyone but the parties. The War's awakening should do something to rid us of all this absurd and archaic wastefulness. In Building we have done our best to get away from juries, but our arbitrations are still too often found to be not much better. What we need is a Tribunal of Building Arbitrators, similar to those of other trades in the City, where practical men, who know their business inside and out, deal quickly and finally with disputes on the facts and out of their own knowledge. We are still too much in the hands of our experts, who, working with lawyers and counsel, waste much time and money, and then often end by leaving the cases to go through the courts.

At Carlisle Consistory Court, last week, the Vicar of Lanercost, the Rev. T. W. Willis, applied on behalf of Mr. John Charlton, Bank House, Lanercost, and also of Newcastle, for a faculty authorising him to place on the south wall of Lanercost Priory Church a marble tablet in memory of his two sons—Hugh Vaughan, a lieutenant in the Northumberland Fusiliers, aged 32, who was killed on June 24, 1916, and John MacFarlan, a captain in the Northumberland Fusiliers, aged 25, who was killed on July 1, 1916. Mr. Willis said Mr. Charlton was the well-known artist, and he wished the design of the tablet to be of a simple character. He had selected white marble because it was emblematic of the purity and rectitude of his sons. There might be some objection to white marble because the other tablets in the abbey were chiefly bronze or brass. Neither the patron nor the vestry had raised any objection to the memorial or its position. When it was suggested to Mr. Charlton that white marble might be rather obtrusive he had expressed his willingness to have it toned down to a greyish colour. Having regard to the whitish colour of the walls, white marble would not look so obtrusive. Chancellor Prescott said in his opinion it would be a good thing if the parishioners of a parish would agree to postpone the placing of memorials in their parish church until the end of the war. It would then be possible for them to combine and erect something that was artistic and beautiful, worthy of those who had given their lives for their country, and worthy of the sacred edifice in which it was placed. Descendants in days to come would look with far more pride on such memorials than on some of the isolated and sometimes unworthy records which were occasionally proposed. Knowing the historic and famous church of Lanercost Priory, he did not think that the proposed slab was worthy of the position, and that, considering the position in which it was proposed to place it and the adjoining memorials, it would be out of place. He asked the vicar to bring the matter before Mr. Charlton and to suggest to him that a brass or bronze tablet would be much more in keeping with the place. He ad-

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journed the case till the next Court, so that another application might be made in such form as the applicant might be advised.

The Scotch Burgh of Buckie has been taught a useful lesson by the Edinburgh Court of Sessions as regards the right of its councillors to interfere with the burgh engineer in the apparently very proper exercise of his discretion. The plaintiffs were the Corporation of Buckie, and the appellants Messrs. Charles Brand and Son, of Glasgow, contractors for works of harbour extension, now approaching completion, had removed some of their plant, and had intimated their intention to remove such additional plant as was no longer required for the remaining work to be done. The contract provided that all vessels, plant, and material provided by the contractors should become the absolute property of the town council, and should not be removed without the written sanction of the engineer appointed by the corporation. Application was made to him for his sanction to the removal of certain plant, and he informed the town council of the application, which he was informed ought to be granted. The town council informed the engineer that he was their servant in this matter, and instructed him to withhold his consent. In pursuance of these instructions the engineer replied to the defendants that he was unable to grant permission. At a later stage, however, and again on the instructions of the town council, he told the defendants that they were at liberty to remove certain wagons provided the price was deposited with the town council as security, in addition to £4,000 of retention money already held by them. The contention of the defendants on appeal was that the town council's change of front came too late, and that they were not bound to accept the decision of the engineer on the ground that he was disqualified by having already decided the question in dispute against them. They argued further that the town council in controlling the engineer had broken their contract, and had no title to rely upon the absence of information which they caused him to withhold. The Divisional Court virtually upheld the view of the sheriff-substitute that, as the town council had renounced the position that they were entitled to control the engineer, and since the latter had merely acted on a wrong view of his legal position, there was no reason for the contractors thinking he was biassed against them, nor why he should not proceed to consider an application for the removal of the plant. The whole trouble, the Court declared, had been caused by the wrongful attitude taken up by the town council, who were found liable in costs.

"Fourpence a day and find yourself" seems to be the motto of the Narberth Town Council, if the statements made by the surveyor when tendering his resignation at the last meeting are well founded. Out of that princely remuneration the surveyor seems to have been thought to have become a perfect Crœsus, for, as the council did not advance the necessary money with which to pay wages, he "had to run all over the town to borrow it." As a result of the subsequent discussion it was resolved to ask the surveyor to continue in office and to let the question of salary remain in abeyance until after the war. He asked to be allowed a month in which to consider this suggestion, and that was magnanimously given him. Meanwhile underbids from retired munition-workers and other millionaires desirous of varying the pleasures of retirement at Narberth by looking after a mile and a-half of streets will doubtless arrive by the dozen.

The National War Savings Committee have made it clear that building societies, whether incorporated or unincorporated, may invest in the new War Loan any portion of their funds not immediately required for the purposes of the society and which the rules permit them to invest, notwithstanding that the rules do not specifically provide for investment in such a security. The Committee also state that a registered industrial and provident society may invest any part of its capital in the new War Loan, if its rules do not direct otherwise; and that the trustees of a society or branch registered under the Friendly Societies Act, 1896, may, with the consent of the Committee or of a majority of the members present and entitled to vote in general meeting, invest its funds or any part of its funds to any amount in the new War Loan, notwithstanding that the rules do not specifically provide for investment in such a security.

BUILDING MATERIALS.

The informal conferences, the first of which is to be held at the R.I.B.A. to-day, will, no doubt, elicit discussion of a more or less valuable nature, though the subjects so far tabled are rather hackneyed. Probably the last on the list, which is set down for March 5, when Mr. Searles Wood will deal with new materials and methods and their influence on designs, will prove the most fruitful. Some of these, in the recent past, have hardly influenced design for good—whether because of the ignorance of the architect using them, or resulting from other causes, we do not propose to discuss. Our purpose is to suggest that at some subsequent date it might be advantageous, at any rate to the majority, to discuss the possibility of establishing a standard of materials for the sake of honest builders and to check dishonest contracting. We have several times suggested this during the past half-century, but nothing has been attempted. We have it is true, had tests formulated by the members or accredited representatives of some of the trades, as by the Plumbers' Company for instance. We have also tests given in some of the textbooks; but they are not always reliable or easy of application, probably mainly because the experts who have conducted the tests have had little or no experience of the defects met with by the architect and builder in actual practice, and have had ideals of comparison in view which, however excellent, are sometimes hardly the standard of excellence or durability the practical user is anxious to ascertain. For the most part, too, we expect that researches undertaken to arrive at such tests have been to a considerable extent superficial owing to the lack of means and adequate requital of the labour of those undertaking them. One exception of course has been the good work done by the British Fire Prevention Committee in regard to the behaviour of materials under fire. If something of that sort could be done under the auspices of a really competent authority—preferably by the R.I.B.A. itself—and revised from time to time as circumstances demanded, we are sure it would be welcomed by all honest manufacturers and by architects and builders, and that the public interest in the employment of really reliable materials and appliances would be the more effectually safeguarded.

With some materials general tests of the sort that exist are of little value. A standard of uniformity as regards stone might be hard to fix; but architects might well demand some guarantee of quality, such as degree of porosity, seam, or weathering. Again, in regard to crushing and tensile strength, *in actual use*, or resistance to stand a cross strain, as in the case of lintels or landings, most of us are pretty much in the dark. Not much more certainty exists about bricks and tiles, though with these, when supplied by a maker of reputation, there is more to rely on. With the metals—iron, steel, and zinc especially—we assurely need more information than is at present available. All of us probably know, for instance, that thickness of wire-gauge is no guarantee of the quality of the iron itself or of the care with which the coating has been applied. Tests of cement are available, and of concrete and mortar; but these again are mostly the results of the examination of samples, and not of the behaviour of the materials in actual use. Asphaltes, again, are a somewhat unknown quantity except in the case of the really reliable brands, against which, in the absence of any realised standard of comparison therewith, the purveyors of manufactured imitations, not unfrequently tender to their own advantage, but neither to that of the honest builder nor of the client.

As regards wood, especially, there is much information available, but most of it is really of little service to the architect because of the lack of information vouchsafed in regard to the condition of the material tested. Of what use are tables, such as one before us at the moment, in which the comparative resilience of different kinds of timber are given? Any architect reading it would know at once that the standards of excellence given are those of ideal, not average, woods. But how is he to know that the timber the builder gets is in the same condition, soundness, and of freedom from defects and knots as the test-pieces used from which the table was compiled, or that the test-pieces themselves were selected with due care and adequate knowledge?

We repeat that it would be to the general advantage of all concerned if experiments could be conducted by some body of the profession, with scientific precision and thorough knowledge of the behaviour in actual use of the material tested. The labour would be considerable, and the cost as well. But in no long time the work should be self-supporting. Then we should have a series of really reliable standards on which contractors might base their prices, and to which we and the other professional journals give currency week by week, instead of those which we know not a few of our readers think rather wide sometimes, but which are based on information which it is difficult to check, and which has to be obtained in different localities.

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"MY SIX MONTHS' TRAVELS IN ITALY." *

BY IVOR BEAUMONT, A.R.C.A., F.I.B.D.

I wish to take you in imagination and to some extent in reality, with the aid of photographs and sketches, to the mingled beauties of Italy, and to the historic sites therein.

On May 28, 1909, I travelled by train from London to Tilbury, where I boarded the P. and O. liner "Orontes," which departed from Tilbury Docks at 1 p.m. The good ship left Gibraltar June 2. On Sunday morning, June 6, we steered into the Bay of Naples. It is exceedingly beautiful and well deserving of all the praise that has been lavished upon it. The coast is well studded with villas and dotted with gardens.

Arriving in the harbour at 6 a.m., after having had breakfast in the saloon, I went on to the upper deck and viewed Naples. The sight was superb. "Vedi Napoli e poi muori." The city rises from the shore in the form of a great amphitheatre, divided into two crescent shapes, by the hill of San Martino, which is well worth the while to climb, from which a splendid view may be obtained, and then to explore the ruins of the monastery of San Martino. The coast sweeps round to the beautiful town of Sorrento and further ties the famous island of Capri. There is no doubt whatever of the grandeur of the whole, and the island of Capri completes the marvellous curve of beauty that bounds the Bay of Naples.

But, for those whose time is limited, one cannot, I think, do better than visit the Muse Nazionale. Here are all the chief treasures found at Herculaneum and Pompeii after the eruption. The ancient bronze in the Museum are fine. One can feel that they are a revelation of what bronze statuary can be. There is nothing to be compared with them anywhere else. The exquisite modelling, life and movement, illustrate the surpassing excellence of antique sculpture.

Before I describe some of the buildings, I wish to draw your attention to one curious distinction between antique and modern bronzes. A bronze statue is never solid. In modern bronzes the core or hollow part inside the statue is rough and shapeless and about an inch or two thick all round. But this is not so in antique bronzes. The core is as beautifully finished in form as the statue itself, and in the casting process the ancients must have used two perfect models coinciding with each other. The ancients had secrets in the art of casting which, like many other things, are lost to the modern world.

Naples, I should think, is one of the noisiest cities in Europe. The clatter of wheels at all hours of the day and night, the cracking of whips, and the shrill cries of the hawkers, and also the ceaseless importunities of guides, street vendors, and beggars are very distracting. The most medley throng that I saw was in the Via Toledo towards evening, and especially the narrower side streets near Santa Lucia. Here I saw cooks at their stoves in the open air, and carrying on a brisk trade in macaroni, fish, etc.

One of the principal buildings of Naples is the Church of San Francesco di Paola, with its dome and arcades. It is really an imitation of the Pantheon at Rome. In the interior is a very beautiful altar inlaid with precious stones. Quite near is the Royal Palace, in front of which is an equestrian statue of one of the Neapolitan kings.

On the morning of June 10, very early, I took the train for Pompeii, leaving from the Stazione Circumvesuviana. The views are very fine as we journey along. We crossed the lava streams, and for the first time I saw that in the dry state it is very similar to cinders. Having read of Pompeii before visiting it, I enjoyed seeing the ruined houses, which can be entered from the street by a narrow passage, which leads to a large court open to the sky, in the centre of which is a reservoir for rain-water. Most of the rooms are small, and contain frescoes and mosaics. The wall decorations to be seen at Pompeii are very charming. In fact, ancient Pompeii was a brilliantly painted city and rich in decorative crafts. Whilst at Pompeii I was enabled to study a few complete schemes of colour, and even after the lapse of so many centuries, the colours still retain much of their original freshness. Even at the present time the excavations are constantly bringing to light works beautifully fashioned in bronze and marble, which, of course, go to show that the arts then held a position such as we can scarcely boast of nowadays.

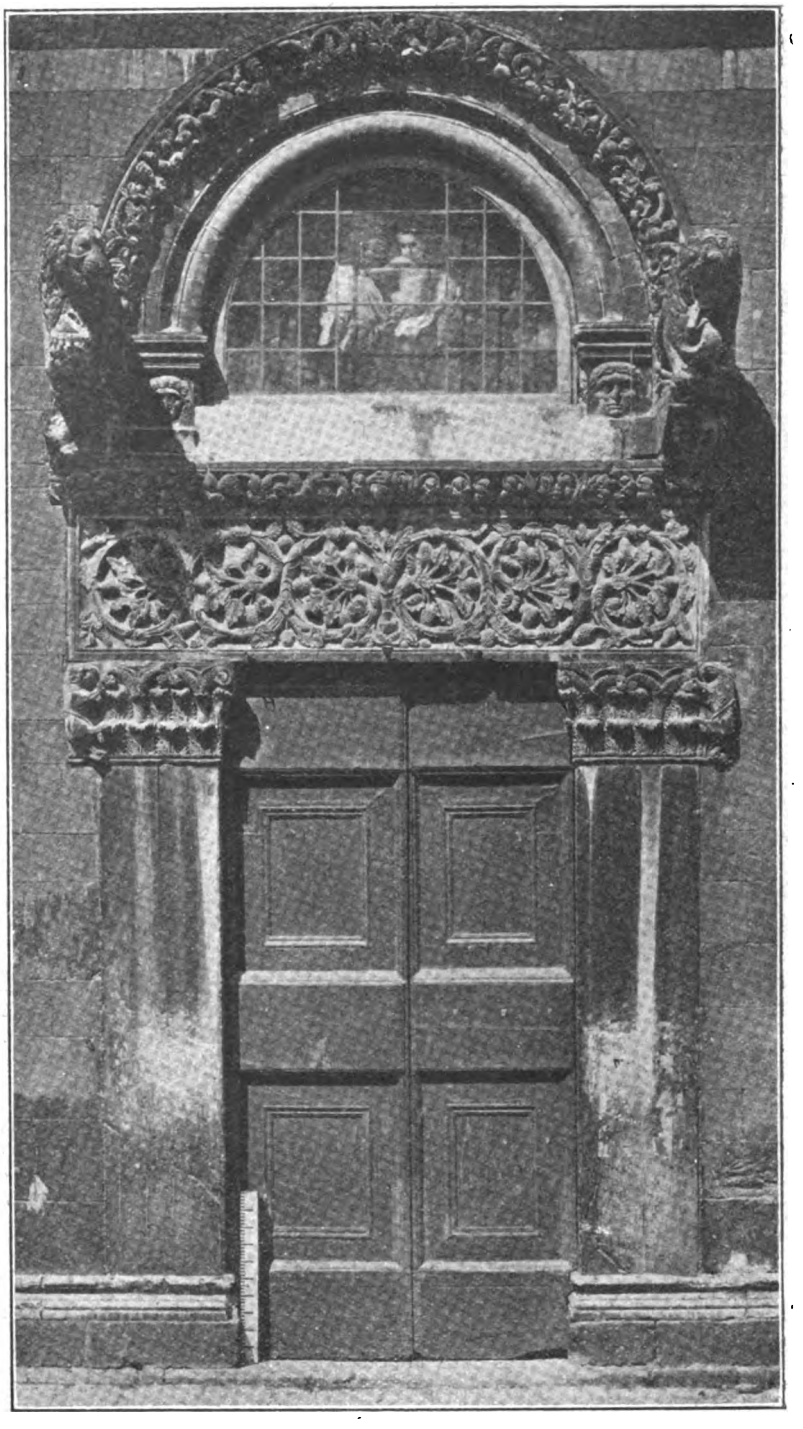
The following day I visited Capri. The island is a charming feature in the Bay of Naples. The shore is very precipitous, but exceedingly beautiful. The Blue Grotto is one of the chief sights.

On the morning of June 15 I left Naples for Rome by the "treno diretti." Rome, the Eternal City, the capital of Italy, is situated on the banks of the Tibes. Modern Rome is principally confined to the plain, while on the heights lies ancient Rome.

St. Peter's, the greatest Christian Church in the world, stands on what is said to be St. Peter's tomb. Over 150 years were spent in building. For three and a-half centuries the Church of St. Peter has been the goal of Christian pilgrims to Rome. A mighty flood of light pours down on the marble floor, lighting up its vast spaces, its gilded vaults and marble walls, the fine statues, tombs, and decorations, making it the most magnificent and the most famous building of Europe.

The Vatican Palace close by has been the home of the Popes since the end of the fourteenth century. It contains about a thousand halls, chapels, and rooms, and the greater part of it is used to house the splendid collection of books and works of art that have been gathered together by the Popes. The paintings in the chambers of the Vatican were, of course, Raphael's greatest work for Pope Julius II. The camera della Segnatura, containing many masterpieces, the Dispute of the Sacrament. The School of Athens and the Parnassus, which occupied the painter three years, and afterwards he was commissioned to paint the room known as the Chamber of the Heliodorus, in which the painter's art was dedicated to the symbolical representation of the power of the Church. The Vatican decorations of the Loggie were being painted at the same time.

Another still more ancient building in practically perfect preservation is the Pantheon, which was built as a temple to all gods



DOORWAY, CHURCH OF S. GUIST'S, XIITH CENTURY.

* A paper read before the Incorporated Institute of British Decorators.

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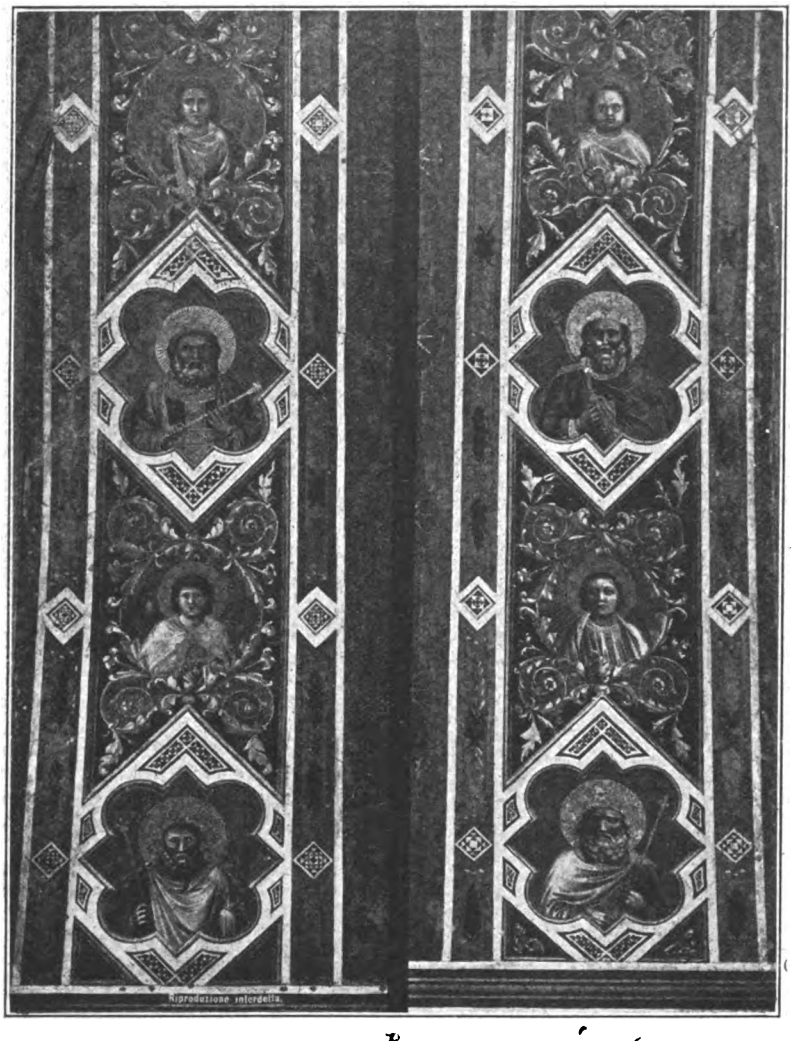
twenty-seven years before the birth of Christ. It is one of the most wonderful buildings in the world from an artistic standpoint. The ceiling of this fine Greco-Roman building is formed by a dome of the most elegant proportions. The only source for the admission of light being the circular opening in the apex of the dome.

The walls and floor are covered with marbles of various colours. The Pantheon is the last resting place of Raphael, Perino del Vaga, Giovanni da Udine, and Peruzzi, all great decorators.

Many of the Roman Emperors did something towards beautifying the old city on the seven hills. There is the Arch of Titus, showing his victory over the Jews, and the spoils of the Temple being carried round Rome in Triumph. Is there any wonder that the Jew refuses to pass underneath the archway?



WALL DECORATION, ARENA CHAPEL, PADUA.
DECORATION BY GIOTTO.

As one wends his way through the ruins of the Forum Romanus, one is reminded of the past. It was here that those mighty in war and wise in council met for consultation and advice. Here the sandalled feet of the Cæsars trod. Simply the ruins of the temples remain, and the Forums of Cæsar Augustus and others. But the monument of Rome's power and grandeur is the Coliseum, which stands unrivalled perhaps as an example of architectural dignity and execution. It was completed by Titus in A.D. 80, and was for four hundred years the scene of the cruellest spectacles the world has ever witnessed. Here tremendous crowds of spectators watched the death struggles of gladiators, fierce fighting of hundreds of animals and the brutalising and inhuman exhibitions of the martyrdom of Christians. During the Middle Ages much of the masonry was removed, and now the Coliseum is the most impressive of ruins, a monument of the dead past and an unhappy memorial of the thousands who found a tomb within its faded walls.

Nowhere in Italy, except perhaps at Ravenua and St. Mark's, Venice, can mosaic work be seen to such perfection as in Rome. The apse was the chief feature of the basilica and is preserved intact in the Churches of St. Pudenziana. It was probably the first Christian church built in Rome, and it is associated with the story of St. Peter in the year 42. He lodged first with Aquila and Priscilla in the Aventine, now the Church of St. Prisca. The mosaics of this fine and early apse are on a blue background with Apostles in colours and gold. Some very fine work is also to be seen in the churches of Saints Cosmo and Damino, of the sixth century; St. Agnese fuori le mura, of the seventh century; St. Nero and St. Achilleo, of the eighth; and St. Prassede and St. Cecilia of the ninth centuries; St. Maria in Trastevere, and San Clemente, of the tenth and eleventh centuries; Sta Maria Maggiore and San Giovanni Laterano of the thirteenth. In most of these Roman basilicas are to be seen remains of coloured decoration on the beams, purlins and rafters, with geometrical patterns painted on in a most direct manner.

Mosaic was also used by the Cosmatis for the decorations of the ambones and baldachini. The tesselated pavements which cover the floors of so many of these churches are admirably designed in geometrical patterns composed of pieces or red, green, and white marble of various shapes.

Passing through lovely scenery I arrived at the Stazione Orvieto. Arriving in the town some boys accompanied me with my bag to an "Italiana Casa." But I longed to see the Cathedral, and was not the least bit disappointed. Orvieto is built as near the sky as circumstances will permit; in fact, all the old Etruscan cities are in this happy position. The drive up to Orvieto is over a fine road that winds round and round up to one of the old gates or the city. The façade is really the finest of all the Gothic façades I have seen. The brilliant colours of the mosaics are subdued by the soft colour of the lovely columns. What marvellous reliefs! And all the wonderful work around the portals. Then there is the interior, which gives one the impression of simplicity. The beamed roof is delicately coloured in grey and red, which is supported with round or octagonal columns with arches of round, simple mouldings. The windows are filled with yellow translucent layers of alabaster, which are often turned to rich gold when the light of the sun streams through. The roof of the walls of the principal chapel are covered with frescoes, which look as if painted yesterday. Here Fra Angelico, of Fiesole, a famous painter, spent three-and-a-half months painting the spandrels in the ceiling. He and his pupil, Benozzo Gozzoli, executed two of the spaces in the vaulting over the altar. The rounded projecting rib of the ceiling is painted with flowers of cypress green, with here and there rich red and golden flowers. The whole is exceedingly beautiful and very effective, accentuating the fine curves in the vaulting. Groups of the Apostles are represented in pyramidical form, broadly painted upon a background of gold. The Doctors of the church, too, are depicted, and Christ in Glory with angels on either side against a blaze of gold background. The fine frescoes on the walls are by Luca Signorelli.

The views from the cliff edge at Orvieto are glorious. I found the peasants very interesting and lively. There are all sorts of nook-and-corner shops which are quaintly picturesque in the narrow cobble-stoned streets. Often I have heard the peasants singing in their quaint Italian way as they return from their work in the fields at evening, some carrying large bundles of grass on their heads and others on donkeys.

I took the train for Siena, and arrived there one hot July day. Siena is the queen of Tuscan hill cities. The campanile of the cathedral was rosy with the pink of precious marbles, and the Torre del Mangia ruddy with all the gleaming reds of ancient brick rising high above the terraced dwellings. I stayed a few weeks here, but to give you a detailed account of all I did and saw is beyond the confines of this evening. But, in passing, I will just mention the cathedral, the façade of which is adorned with sculptural decoration and mosaics. Red, black and white marbles were used in the building. The interior is very decorative with alternative courses of black and white marble. The pavement of the cathedral is a work of art composed of inlaid marbles, black, red, white and yellow, with battle scenes and illustrations from the life of Elijah. Of course inlaid marble work had been done by the great Italians before this beautiful pavement was thought of; for instance, in the gorgeous black and white eleventh century choir screen and pulpit in the Church of San Miniato, and on the floors in the cathedral at Lucca and the baptistery, Florence. The central feature of the interior of Siena cathedral is the wonderful octagonal pulpit in white marble by Niccolo and his son Giovanni Pisano.

As I was walking down the left aisle, I was attracted by a door of crossed knotted bronze ropes. Here was the entrance to the library of Cardinal Piccolomini, with its marvellous fresco decorations by Pinturichio. The decorations were begun in 1503 and finished about 1507. The great decorative paintings on the walls illustrate the life of Pope Pius II. A sprightliness of splendour has been given to the whole interior by the judicious use of gold throughout the decorations.

Daintily painted ornaments fill the triangular spaces of the vaulting in alternate colours of black, gold and vermilion. These surfaces are beautifully divided by vaulting ribs, ornamented in red and gold on a background, these ribs being separated from the panels by white bands or mouldings, with great dexterity and daring, yet producing a triumphant finale.

But one should not leave Siena and its

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vicinity without studying the decorative work in the baptistery of San Giovanni near the cathedral. The walls and vaulting are decorated with fresco paintings of the early fifteenth century. In the centre stands the beautiful font, in marble, with its bas-reliefs in bronze, by Donatello and Ghiberti, and Jacopo della Qurcia. Again, in order to study the work of Signorelli, a visit to the monastery at Monte Oliveto, a beautiful ride in the country, will well repay the trouble taken.

Leaving Siena, I passed through Perugia, Assisi and Citta di Castello on my way to Florence. Perugia, even at the present day, retains the aspect of a city in the Middle Ages. The irregular, steep and winding streets are very picturesque.

The old Chamber of Commerce, known as the Collegio de Cambio, and the audience hall adjoining the chapel were decorated by Perugino, with Pinturrichio as his assistant. The work was completed in 1500. Perugino received the commission in 1499 for decoration, but from the colouring of one of the rooms it is thought that the work is that of Pinturrichio, the prince of decorators. On the walls of the Sala di Cambio are painted the four virtues, together with historic personages The three Christian virtues are to be seen in "The Transfiguration" (as the fulfilment of Faith); "The Adoration of the Mag" (as a revelation of Love); and "The Prophets and Sibylls" (as the heralds of Hope). On the ceiling, in medallion shapes; are painted with great freedom of touch, the Seven Planets, surrounded by beautiful ornament. Some of the finest carved and inlaid "tarsia" work is to be seen in this room. The doors and judicial benches are by Domenichino del Tasso, a Florentine wood carver (c. 1490).

The colouring and treatment of the low vault in the audience hall reminds one of the work in the Apartamenta Borgia, in the Vatican, decorated by Pinturrichio. The vault is divided into several shapes by gilded mouldings. The square panels in the four corners of the ceiling have bright red grounds powdered with gold dots, the ornament painted on these grounds being characteristic of Pinturrichio's work (as in the library of the Cathedral, Siena). The rectangular panels have blue grounds dotted with gold stars, with figures of the Evangelists painted in beautiful toned colours of red and green. The central shape of the vault is blue, on which the decorator painted the four Evangelists. The three-sided panels surrounding the large central division have gold grounds with ornament filling the shape.

Needless to say, Perugia possesses an unusual number of handsome buildings and monuments, one of which is the artistic fountain in the Piazza del Duomo, in front of the Cathedral.

Assisi is picturesquely situated high up on the hills, with the fair Umbrian valley lying stretched out far below. Foremost amongst many eminent names, there is, perhaps, none which occupies a higher place in the religious life of the thirteenth century than that of St. Francis of Assisi. He was richly endowed with rare gifts and possessed the power of drawing his fellow men to him, and imparting to them his convictions and sentiments. Erected over his tomb is the magnificent monumental church to which I now wish to direct your special attention; in fact, it is acknowledged to be one of the finest examples we have illustrative of the true employment of colour in decoration. The lower church was built in 1232, two years after the death of St. Francis, and the upper church was erected twenty-one years later in the Gothic manner. The beautiful Gothic portal marks the entrance to the lower church in the cloistered quadrangle. As I wended my way through the vestibule I was greatly impressed by the feeling of solemnity and grandeur, a perfect harmony to behold! And not least the exquisite effect of the harmonious combination of richly luminous colouring. It is really a convincing example of the accurate application of colour in relation to church architecture, whether in mural decoration, mosaics, or stained glass. In this Cathedral of Assisi are the grand frescoes by Cimabue, Giotto, and Simone Memmi, which are encircled by a beautiful framework of coloured detail, scrolls, and interlacing foliage, accentuating the lines of the architecture. In fact, on every part of the floor, walls, and vaulting colour is applied to the architecture. Decoration of such a high order not only powerfully aids the architecture, but works hand in hand with the latter as a teacher.

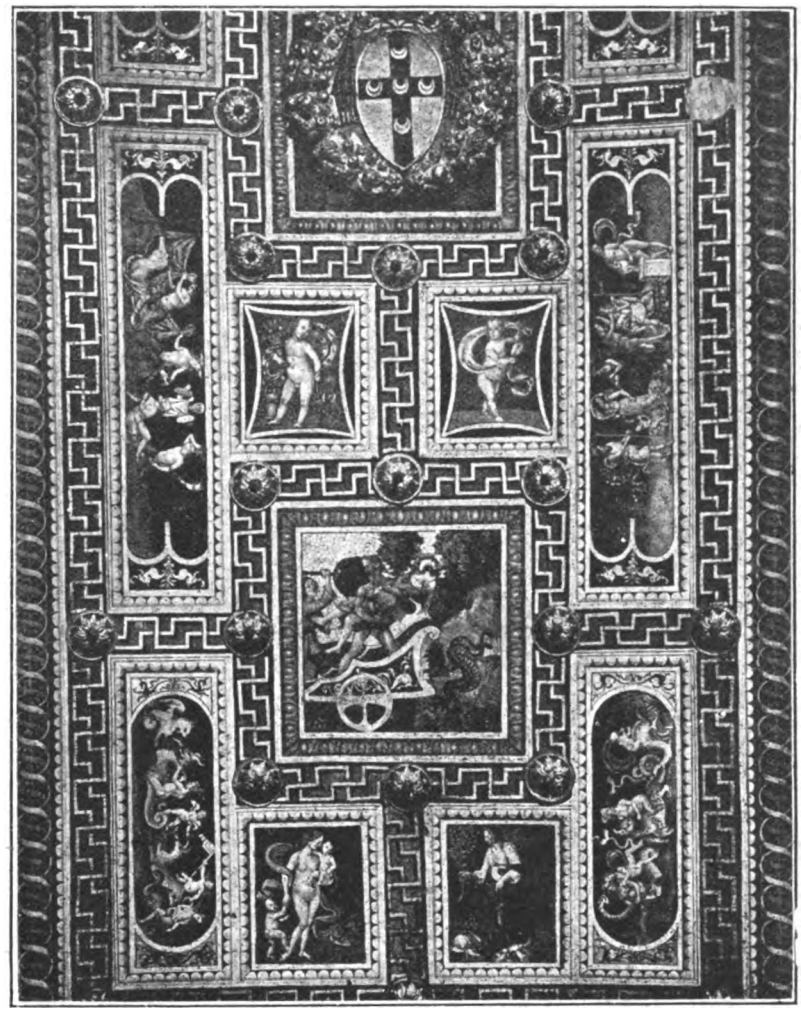
Citta di Castello is not far from Perugia, and is most famous for its Renaissance buildings. The Palaces of the Vitelli contain some very fine loggias with magnificent decorative work.

Let us now pay a visit to the wonderful city of Florence, which has grown up, as it were, in the bottom of a basin, with majestic hills rising round about it as if to defend it from the rest of the world. Florence began to be more than a thousand years ago. The great black-and-white marble Cathedral, with its wonderful dome by Brunelleschi, and the Campanile by Giotto; the quaint Baptistery, in which for a thousand years every Florentine child has been taken to be baptised. The most famous gates in the world are the main gates marking one of the entrances to this wonderful Baptistery of San Giovanni. They were designed by Lorenzo Ghiberti, who began to work on them in 1425, and took him nearly thirty years to build. Michael Angelo said they were fit to be the gates of Paradise. There are models of these gates, actual size, in the South Kensington Museum and Royal College of Art.

Florence holds one captive everywhere, indoors and out. The walls of the churches are covered with frescoes, the Choir of Santa Maria Novella being decorated with frescoes by Ghirlandaio in 1490; in fact, his finest work, I should think. The cloisters and the room known as the Spanish Chapel contain decorations painted by Giotto and his contemporaries. Several chapels in the church of Santa Croce, too, were decorated by Giotto and Taddeo Gaddi.

The ancient palazzi of mediæval Florence differ widely from the palazzi of Rome and Venice. The Palazzi Riccardi and Strozzi are famous examples. The front of the Palazzo is regular and almost rectangular, with a great arched door in the centre of the ground storey, giving entrance to the courtyard in the interior. Over the doors and stairways that lead from the court to the rooms above and around, the heraldry of ancient families is suspended. There is usually a fountain in the middle of the cortile, with its bronze cupid or Mercury, from whose lips the water just trickles.

On either side of the arched entrance the windows are square and small, and defended by iron gratings. The sills are far above the head of the tallest passer-by. There is generally a stone continuous seat, which, needless to say, is pretty much at the service of the beggar and peasant. At the principal angles of these famous palaces were placed beautiful wrought iron sockets, really intended to receive the end of a flagstaff or torch on the occasion of a festa.



CEILING DECORATION BY PINTURRICHIO. LIBRERIA PICCOLOMINI, SIENA CATHEDRAL.

I cannot leave the Palazzo Riccardi (which was formerly the Palace of the Medici family) without mentioning the beautiful little chapel at the top of the staircase. Here Benozzo Gozzoli spent about four years decorating the walls and ceiling.

The towns of Pisa, Lucca, Pistoia, Prato, and Ravenna would take too long to describe in detail. But among the many people who visit Italy one finds a great diversity of opinion as to which town is the most interesting. Some maintain that Rome is without doubt *the place*. Others find such a charm in Florence, without feeling the slightest desire to quit it in quest of new scenes. But I think you will agree with me that Venice is

(*Continued on page 86.*)

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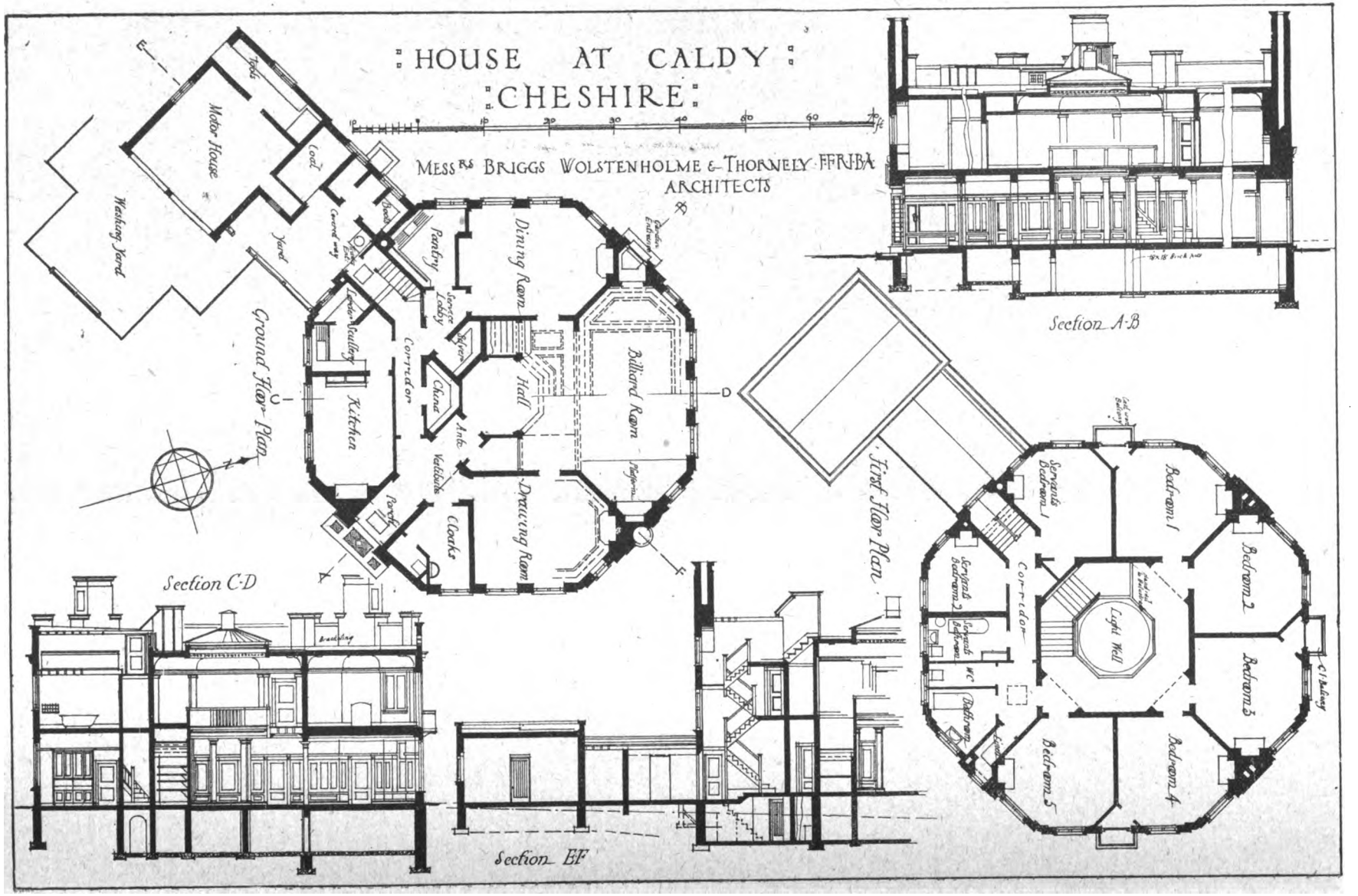

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LAVDATE DNM IN SCIS EIVS LAVDATE EVM IN FIRMAMENTO VIRTVTIS EIVS LAVDATE EVM IN VIRTVTIBVS EIVS LAVDATE EVM SECVNDVM MVLTITVDINEM MAGNITVDINIS EIVS
LAVDATE EVM IN SONO TVBAE LAVDATE EVM IN PSALTERIO ET CITHARA LAVDATE EVM IN TIMPANO

SINGING GALLERY BY LUCA DELLA ROBBIA: MUSEUM OF SANTA MARIA DEL FIORE, FLORENCE.

EXAMPLES OF ITALIAN ARCHITECTURE AND DECORATION; ILLUSTRATING PAPER BY MR. IVOR BEAUMONT.

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Stewart Bale, Photo.]

AN OCTAGONAL HOUSE AT CALDY, CHESHIRE: THE HALL AND BILLIARD ROOM.

Messrs. BRIGGS, WOLSTENHOLME and THORNELY, FF.R.I.B.A., Architects.

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Stewart Bale, Photo]

THE FRONT ENTRANCE OF AN OCTAGONAL HOUSE AT CALDY, CHESHIRE.
Messrs. Briggs, Wolstenholme and Thornely, FF.R.I.B.A., Architects.

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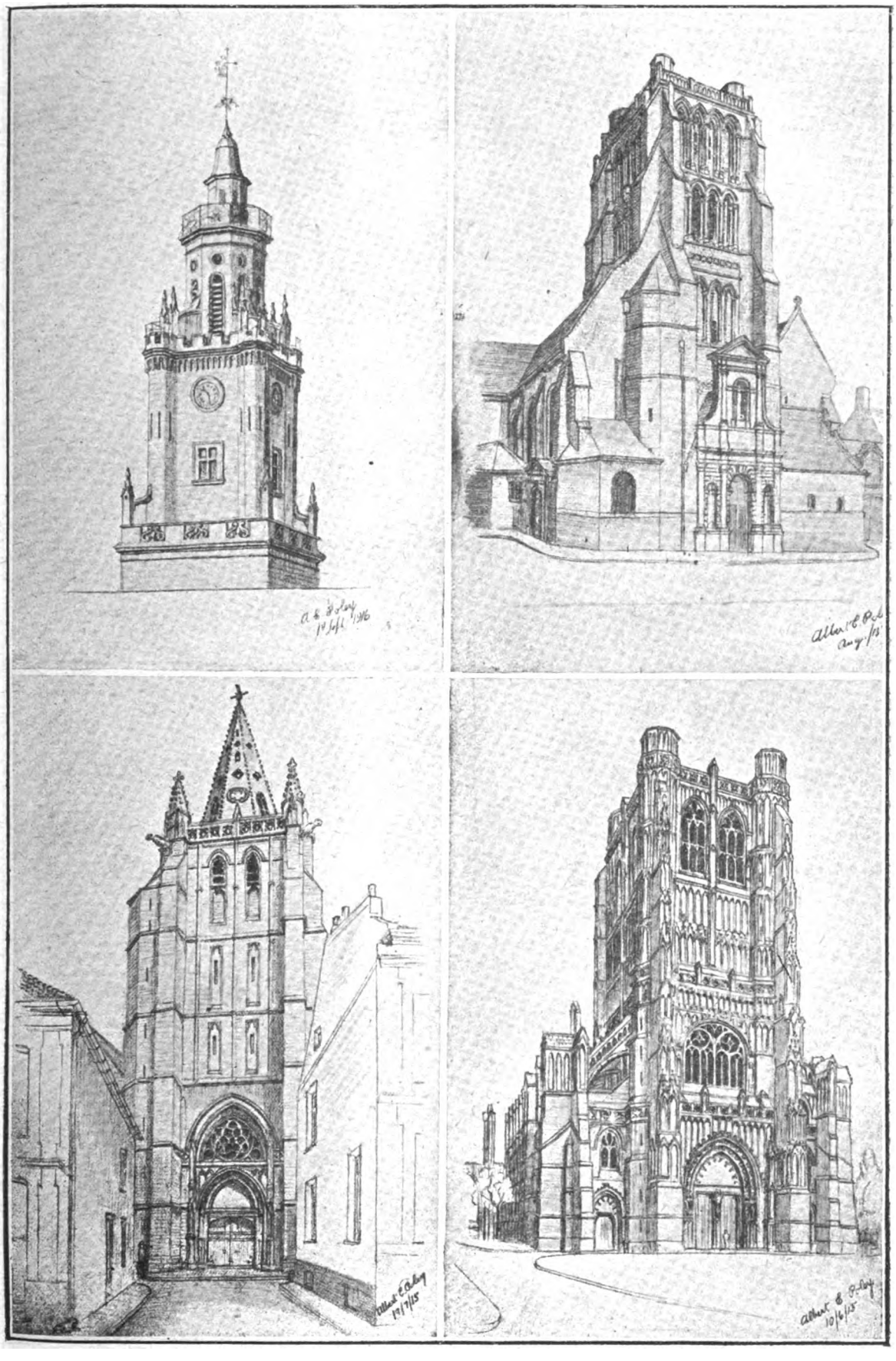

Tower, Hotel de Ville, Hesdin.
St. Sepulcre, St. Omer.
St. Denis, St. Omer.
Abbey St. Bertin, St. Omer.

G.H.Q. TROOPS' EXHIBITION OF ART.—GRAND PRIX DIPLOMA SKETCHES IN FRANCE
By Lance-Corp. A. E. Poley, Silver Medallist R.I.B.A.

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"MY SIX MONTHS' TRAVELS IN ITALY."

(Continued from page 75.)

the one place that must be seen, for Venice certainly possesses a charm of its own quite apart from that of any other Italian city. It is unique in its situation, its art, and its attractions. The Piazza is the heart of the city, and gives one the most striking evidence of the ancient glory of Venice. Here are great and imposing buildings: the Basilica of San Marco, the Doge's Palace, and the Palazzo Reale and Loggia. The Piazza in the evenings is a fashionable promenade and possesses a charm all its own.

In front of the great Cathedral stand three richly carved bronze pedestals, which support flagstaffs on which the banners of Italy are waved on festa days. My time was fully occupied sketching in the Cathedral of St. Mark's and the Doge's Palace. The façade is richly vigorous, bright colours being used in large and reliefs. The polished marble columns, the lustrous gold and colouring is the most perfect in the world. The walls of the interior are lined with slabs of marble to a height of twenty feet, forming a most beautiful pattern. The domed ceilings and soffits of arches are covered with gold mosaics, with figures of saints in bright yet harmonious colours. The pavement is of tesselated marble, noted for the beauty of patterns and devices. The vestibule, too, is covered with mosaics of the thirteenth century, the subjects being chosen from the Old Testament.

Magnificent decorative work can be seen in the Ducale Palace; the Sala del Senato and Collegio, decorated by Paolo Veronese and Tintoretto. The decorations are very fine and vigorous, bright colours being used in large masses, contrasted by colours of more subdued tones, and the whole enriched with gold. The decorations, I may say, were executed in oil colours and not fresco. The exterior of the Palace is very charming; the simple diaper pattern above the arches being white, grey, and pink marbles.

One should not leave Venice without studying the twelfth century mosaic work in Torcello Cathedral. They are really superb.

Padua, Verona, Milan, and Pavia were the next towns I visited. I find, however, that time will not permit me to speak of these, but, nevertheless, I thoroughly enjoyed the many weeks' stay there, studying the decorative work of Giotto; the beautiful decorations in the Church of Saint Anastasia at Verona, and the external decoration of the Palazzo del Consiglio.

My travels in Italy culminated in a few quiet days by the side of Lakes Como and Lugano.

PROFESSIONAL AND TRADE SOCIETIES.

Royal Institute of British Architects.—The Council have arranged for a series of conferences to be held at the Institute on subjects of interest to architects and of importance to the public. The conferences will be held on Wednesdays at 3.30 p.m. at fortnightly intervals, beginning to-day (Wednesday) January 24. The following is a list of subjects and dates so far as at present arranged, together with the names of the openers of the discussion and chairmen of the meetings:—January 24.—"Architecture and Civilisation." Opener, Professor W. R. Lethaby (F.); Chairman, Mr. F. W. Troup (F.) February 7.—"Education of the Architect." Opener, Mr. Robert Atkinson (F.); Chairman, Mr. Reginald Blomfield, R.A. February 21.—"Education of the Architect" (continued). Opener, Mr. A. E. Richardson (F.); Chairman, Mr. H. V. Lanchester. March 7.—"The Control of Street Architecture." Opener, Sir John Burnet, R.S.A., LL.D. (F.); Chairman, Sir Aston Webb, K.C.V.O., C.B., R.A. (F.); March 21.—"New Materials and Methods as influencing Design." Opener, Mr. H. D. Searles-Wood (F.); Chairman, Mr. E. Guy Dawber (F.).

The Batley General Works Committee have approved plans for a new church hall at Hanging Heaton.

Our Illustrations.

AN OCTAGONAL HOUSE AT CALDY, CHESHIRE, FOR MISS M. E. LAMB.

This house, of which we give the plans with sections and two photographs, was recently erected on a fine site overlooking the estuary of the Dee, with views of the Welsh hills to the south-west. The design, so unusual in form and interesting in character, is the outcome of instructions that the house should take the form of an octagon 60 ft. in diameter, having a flat roof, which would serve as a promenade. A feature internally was to be made of a billiard-room hall. The staircase is lighted by a top lantern. Section E.F. shows the approach to the belvedere roof. The five principal bedrooms were to be as nearly as possible equal in size. In meeting these conditions it was felt to be desirable that access to the drawing-room, dining-room, and front entrance, and all rooms on the first floor from the servants' quarters should be provided without necessarily passing through the billiard-room hall. The plans will explain how these conditions have been met, the whole contrivance being most ingeniously arranged. The floor of the hall is oak, and the walls are panelled in oak to a height of 8 ft. Columbian pine, painted white, has been used for most of the joiners' work. The house is heated throughout by means of hot-water pipes and radiators. Externally the walls are faced with 2½ inch sand-faced Seacombe bricks, varying in colour from dull red to purple. The masonry of the entrance doorway is of Storeton stone. Mr. James Merrit, Birkenhead, was the general contractor, and the architects are Messrs. Briggs, Wolstenholme, and Thornely, FF.R.I.B.A., of Liverpool.

EXAMPLES OF ITALIAN ARCHITECTURE AND DECORATION.

The four illustrations on our double page are described in Mr. Ivor Beaumont's paper thereon on another page. The other three illustrations will be found with the paper itself.

G. H. Q. TROOPS' EXHIBITION OF ARTS. — GRAND PRIX DIPLOMA SKETCHES IN FRANCE.

The Headquarters Staff in French Flanders has awarded the Grand Prix Diploma to Lance-Corp. A. E. Poley, Silver Medallist R.I.B.A., for a series of architectural sketches made on active service during the war. These pencil pocket-book studies were chosen for this distinction in an exhibition of soldiers' art work held recently, and they have now been forwarded for reproduction to THE BUILDING NEWS. Our choice to-day will be followed by another page shortly. The subjects on the present occasion comprise typical buildings, chiefly sketched at St. Omer. Facing the end of the Rue de l'Abbaye of that city rises the noble tower of the Monastery of St. Bertin, built between 1431 and 1520. The founder was the monk of Luxeuil, who came to the place with St. Omer in the seventh century. This abbey long furnished the dominating conventual establishment of Artois, and it was of the Benedictine order. The splendid monastic church was destroyed by the municipal administration of the town in 1830 under pretence of giving employment to the working-classes at the time. Since that act of short-sighted vandalism the premises have been left entirely uncared for, and they are still badly neglected. The tower of the Church of St. Sepulchre, shown by the next sketch, is much earlier in date, with its stone spire of about 1387. Above its single big portal is a traceried lunette window of geometric outline, but rather flamboyant in style. The former cathedral of Notre Dame is approached from the long Rue St. Bertin, and includes work of the thirteenth and fifteenth centuries. The Palais de Justice, the former Evêché, was designed by Mausart, and the Hotel de Ville was erected in 1834 with materials obtained from the ruins of the Abbey of St. Bertin. We include Mr. Poley's sketch of the massive tower of St. Denis with its picturesque Renaissance portal. The tower of the Hotel de Ville at Hesdin, shown also on our page, was erected in 1629. This prettily situated little town on the Canche was founded by Charles V. in 1554, after the destruction of Vieil-Hesden, the ancient Helenum, by the Imperial Army in 1553. Hesdin is, perhaps, best remembered as the birthplace of Abbé Prévost, the author of "Manou Lescant." Its great church, sometimes called the cathedral, is a handsome structure of Sixteenth Century Renaissance, with a splendid portal flanked by two turrets, one on either side. Mr. Poley's careful sketch of this resembles a silver point study and too faint in line to reproduce satisfactorily. We shall, however, shortly give his sketches of the north and south porches of the cathedral of St. Omer, with others. The set includes The Prison, St. Omer, the Hospice Valbelle, and Le Mathurin, with its sculptured Renaissance pediment of Late character. In the northern faubourg of Haut-Pont, the inhabitants preserve the Flemish language and costume, with Flemish manners and customs.

OBITUARY.

The death took place on Monday, at his residence in Chelsea, of Mr. William Frend De Morgan, the well-known son of Augustus De Morgan. Young De Morgan was born in 1839 and educated at University College School and the College, Gower Street, and, having adopted art as a profession, entered the Royal Academy as a student in 1859. In the years following 1864 he was chiefly engaged in stained-glass work, and in 1870 he turned his hand to ceramic work, when his experiments in lustre, at that time not much known in England, attracted attention among artists. His pottery ranks with the best of its kind in England. He was one of the founders of the Arts and Crafts Exhibition Society, and was a great friend of William Morris and Sir Edward Burne-Jones, who appreciated his rare wit and other "lovable qualities." De Morgan, we are told, often sighed for the old Bohemian evenings spent with Burne-Jones in Great Russell Street, when the artist's little Yorkshire maid came in and asked, "'As any of you gentlemen seen the key of the beer-barrel?" At the age of sixty-six, Mr. De Morgan began to write fiction, and hardly a year has since gone by without a volume from his pen.

The death occurred last Sunday at Rathvarna, Chichester Park, Belfast, of the Right Hon. Robert Young. Born in 1822, the eldest son of James Young, of Whiteabbey, he was educated at Belfast Academy. Mr. Young afterwards went to Glasgow University, where he studied mathematics under Dr. James Thomson, father of Lord Kelvin. On his return to Belfast he was articled to the late Sir Charles Lanyon, county surveyor of Antrim, and afterwards M.P. for Belfast. He took a prominent part in the construction of the Belfast and Ballymena Railway (now the property of the Midland Railway of England). He was subsequently engineer of the Midland Great Western Railway of Ireland, and lived for some years at Athlone, where he superintended the erection of a bridge across the Shannon. Returning to Belfast early in the 'fifties, he started as an architect and civil engineer. He was afterwards joined by Mr. John MacKenzie and by his son, Mr. R. M. Young. He was a member of the Senate of Queen's University, Belfast.

We regret to record the death on the 15th instant, at Brighton, of Mr. R. C. Foster, of the firm of Messrs. Foster and Dicksee, of Rugby. Born at Rugby in 1849, and educated at King's College and South Kensington, and under Mr. Arthur Evers, of Great Marlborough Street, W., in the architectural profession, he exhibited in the architectural room at the Royal Academy in 1877 and 1878. In 1879 he joined Mr. W. Sidney Dicksee (a brother of Frank Dicksee, A.R.A.) in taking over the business of Mr. John Bromwich, of Rugby, a well-known building contractor, who had carried out many works under Salvin, Sir M. D. Wyatt, and others. We gave Mr. Foster's portrait in our issue of October 10, 1890, and a long list of the important works executed by the firm, of which

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he remained a director up to the time of his death, although he retired from active business some years ago. They included the Bankruptcy Offices in Carey Street, and other Government buildings, and many large mansions, artizans' dwellings, and other important erections.

We learn with regret, just as we are going to press, of the death of Mr. Edward Robert Robson, F.S.A., F.R.I.B.A., F.S.I., after a short illness, at the age of 81, at his residence at Blackheath. Born on March 2, 1835, he was educated at private schools. Having spent three years in the shops he was the pupil first of John Dobson, of Newcastle-on-Tyne, and then of Sir Gilbert Scott. He travelled much in Europe, America, and Canada. He built the Piccadilly Art Galleries, the New Gallery in Regent Street, the People's Art Palace, Queen's Hall, several hundred schools in London, and many mansions and churches. He was architect in charge of Durham Cathedral for six years, surveyor to the Corporation of Liverpool for some years, and the first architect to the London School Board. In later years he was engaged in private practice in Westminster. His book on school architecture attained a wide circulation, and he was the author of numerous articles and essays in our own pages and those of kindred publications. We gave a portrait of Mr. Robson and some particulars of his career in our issue of September 5, 1890.

HEATING A POROUS HOUSE.*

By GEORGE H. CUSHING.

I am convinced that the operation of the furnace, after the house is built, is a mere detail. No amount of doctoring it or switching coals will after the all-important item—the cost of keeping the house warm. Once the house is built, the amount of fuel required to heat it is well determined. On the other hand, I am now convinced that if a house is designed and built with a few simple facts in mind, it is possible to save twenty to thirty cents a day—more than enough in five years to pay the difference in cost between a good and a shoddy structure.

This applies, of course, only to that part of the country lying north of the Potomac, Ohio, and Missouri rivers, where the outside temperature for 225 days of the year ranges between sixty above and twenty below zero. I am assuming, also, an inside temperature of 72 degs. I am measuring the cost of raising the house temperature from what it would be to what it should be. I am convinced, after studying my own and more than a hundred other houses, that the secret of true comfort—and incidentally of fuel economy—is the proper design and construction of the house itself.

In a word, the cheap and satisfactory heating of a home is primarily a matter of architecture, and secondarily one of construction. All efforts to save money on coal by changing from one grade to another, by doctoring the furnace, by buying smoke consumers, etc., after the house is finished smacks all too strongly of an old simile about a stolen horse and a padlock on the door of an empty stable. All last winter I tried scientific tricks upon a pile of coal to heat a house that was improperly built. I got nowhere. I learned much that coal can be made to do and much that it can't; but with all my wisdom, I couldn't actually heat a house improperly designed and poorly built.

To get the facts before us, I will start at the beginning. When I moved into this house, in May, 1915, it was five years old. It is situated on a lot 135 ft. by 175 ft., and is surrounded by thirty full-grown trees. On the theory that trees break the wind, it should have plenty of protection. It is, in fact, in the centre of a forest one mile wide at its narrow dimension and fully ten miles long. The winter was moderate, there being no more than two weeks of zero weather, with an average temperature during five months of about freezing.

I bought my coal and started my furnace fire early that fall with childlike confidence in the advice given me by a furnace manufacturer. He said that I should be comfortable all winter if I burned during the season only one ton of coal for every 100 ft. of radiation in my hot-water system. My house had 600 it. of radiation; this meant six tons of coal in a winter. I added a ton and a-half to his estimate for good measure. That estimate d seven and a-half tons of coal was gone by New Year's Day, and winter had not yet started.

I knew then that something was wrong, and I was keen to right it. So I hunted up a fuel engineer who has made all sorts of scientific experiments for the Government and various universities. He began to ask me how many windows I had, what sort of material the walls were made of, and how much inside space I had to heat. To explain why he wanted to know all this, he said:—

"When you burn coal you generate heat units (British thermal units, or B.T.U., to be scientific). If you cut a window, you let the heat out. To overcome this loss you must generate heat units. If you have a tight wall, you keep the heat in to a certain extent, but still you lose a lot of it in that way. Walls will radiate heat. If you have a loose wall, you let more of the heat out. To overcome this loss—big or little—you must generate heat units. Then, after spending all this heat merely to hold your own, you still have to heat the air to be warm. It takes heat units to do that, too.

"To do these three things is why you burn coal. As you see, you create heat mainly to offset the loss by radiation through the windows, doors, and walls. When you have stopped that loss, it takes little heat to warm the air inside."

Having that key to my annoying situation, I found in an engineers' almanac a rule governing such matters. It read, as nearly as I can recall, as follows:—

"To offset the loss by radiation through glass in zero weather requires the generation of 80 B.T.U. per hour per square foot of glass. An average of very cold and moderately warm days in winter will demand 40 B.T.U. per square foot of window glass per hour. To offset the loss of heat by radiation through the walls takes, in zero weather, 16 B.T.U. per square foot per hour, or an average for the winter of 8 B.T.U. per square foot of wall per hour. To heat each cubic foot of air in the house, assuming a change of air every hour, takes one-fourth of a B.T.U. per hour."

It requires no laboured arithmetic to tell that it requires 160 times as much heat to offset the radiation through one square foot of glass as it does to heat a cubic foot of air. Also, it takes thirty-two times as much heat to offset the loss by radiation through one square foot of wall as it does to heat one cubic foot of inside air. Therefore, tight windows and storm windows and tight walls are worth while.

To indicate how any home-owner may use this rule to determine how much coal he should burn per season, I will apply it to my seven-room house. The following tabulation embodies the result:—

	B.T.U.
Windows—480 square feet at 40 B.T.U. per hour	19,200
Walls—1,320 square feet at 8 B.T.U. per hour	10,560
Inside air—10,800 cubic feet at ¼ B.T.U. per hour	2,700
Total, per hour	32,460

In one day it requires twenty-four times that, or 779,040 B.T.U. per day. Coal shows great variation. An ordinary grade of anthracite coal, such as I used, will contain about 13,000 B.T.U. per pound. But it is not possible for a furnace to yield 100 per cent. of efficiency. The loss up the chimney is considerable; the loss by radiation through the sides is an item. Therefore, in practice, of the heat generated in the furnace it is conservative to expect to get the use of 60 per cent. For that reason, instead of a possible consumption of coal of 60 lbs. per day, I should have burned not more than 100 lbs. of coal per day.

Last year the cold weather came late. This year the spring came early. So the furnace was needed only during 190 days, which was accounted for, in part, by the fact that the house was closed for a month. So, even with all the windows, I should have burned only 9½ tons of coal if the theory is correct. However, theory went to protest in my case; I burned, as related, eighteen tons of coal. And the house temperature was not the theoretical 70° which may figures anticipate, but more nearly an actual average of 65°. It was practically impossible, in a word, to heat the house.

Analysing, after the experience, as most of us are prone to do—I concluded that the man who built the house had tried the common thing; he had attempted to limit the first cost. I do not say it was a house built only to sell, and hence shoddy. Rather, he feared to make it good enough for himself lest it prove too good for the man who might want to buy it. When once started upon a policy of sparing original expense, there was no logical place where he could quit. Thus he bought a furnace that was two sizes too small. This saved him less than fifty dollars. When I fell heir to this furnace mistake I found that the fire had to be forced all the time. This burned coal much faster than home needs demand and yielded no natural result but waste. Indeed, my yearly excess fuel bill is nearly double what the builder saved on this item.

A similar effort at economy omitted the secondary damper from the chimney or the smoke pipe. That is, the only one installed was a part of the furnace. Thus, when the wind blew, there was no way to put a double check on the draught without shutting it off almost entirely. As a result, the consumption of coal doubled, but the heat escaped up the chimney without stopping to heat the water. To be specific, I burned one Sunday 300 lbs. of coal instead of a normal 125 lbs., but the temperature of the water rose only five degrees. I might say that an ordinary damper to check this loss costs but ten cents, and the most expensive damper I have found costs but five dollars.

The defects in the construction were even more serious. As has been indicated, this seven-room house has an unusual number of windows—forty in all. When the loss of heat through glass is recalled, this makes an expensive heating proposition at best. To make matters worse, the arrangement of them was bad. The south side, where the sun shone, and where a certain amount of protection was afforded, is practically a dead wall. It has few windows. The north side, where the wind is strong, and where no sun enters, is practically all glass. To make it worse, these windows are of the "artistic" kind. They are casement windows made of spongy wood. In wet weather they can be neither shut nor opened. In dry weather they touch the sill only at the hinges. As a result, in winter they leak air into the house in veritable gales. To make them still more "artistic" they are latticed. The builder may have had an eye for beauty, but he was not careful to see that the joints between the wood and the glass were sealed with putty. This made a secondary air leakage.

In construction, the house was stucco on frame. The stucco apparently had been put on without using a proper mixture of sand, cement, and gravel. This is one thing that is almost sure to happen when one starts to save money on first cost. The result was that even the walls leaked air. This, of course, added to the loss of heat.

Having entered upon a catalogue of the demerits of this house for a purpose, I will not overlook the principal one. The effort at "artistic" designing became a conscious struggle to defy every tradition and to eliminate every feature which has the sanction of time. Thus, every interior door downstairs was banished, save one which segregated the kitchen. It is not possible, therefore, to close off any cold room and thus

* From the *Scientific American*. Mainly applicable, of course, to the locality indicated, but there are hints that may well be studied this side, as many who have endured this winter in similar homes will agree.

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protect the rest of the house. On the contrary, everything is wide open. There isn't even a door to close the stairway. As a most natural consequence, every inrush of air at any cold point makes itself felt all through the house and destroys all efforts to heat it evenly and effectively. As a matter of fact, on cold days the family had to segregate itself in the upstairs sitting-room and summon the aid of a gas stove to help out the furnace.

All these things help to explain why I burned 8½ tons of coal more than I should in a mild winter; why I paid 74.80 dollars more for fuel than was necessary; why my house was always cold. They indicate, I believe, that the proper time to study fuel economy is not after the house is built and the cold weather is upon one, but when the house is being built.

CONCRETE AND REINFORCED CONCRETE.

CHAPTER I.

The Joint Committee on Concrete and Reinforced Concrete was formed by the union of Special Committees appointed in 1903 and 1904 by the American Society of Civil Engineers, the American Society for Testing Materials, the American Railway Engineering and Maintenance of Way Association (now the American Railway Engineering Association), and the Association of American Portland Cement Manufacturers (now the Portland Cement Association). In 1915 there was added a Special Committee appointed by the American Concrete Institute at the invitation of the Joint Committee.

Progress reports by the Joint Committee were presented to the parent societies in 1909 and 1912. The report presented in 1912 has been printed by the American Society of Civil Engineers, the American Society for Testing Materials, and the American Railway Engineering Association, and reference to that report may be made for details regarding the earlier work of the Joint Committee, a historical sketch of the introduction of concrete and reinforced concrete, and a bibliography of authorities upon which the report was based.

Since 1912 the Committee has continued its study of the subject, has followed the working out of its recommendations in actual construction, has weighed arguments and criticisms which have come to its attention, and has considered new experimental data. While the Committee sees no reason for making any fundamental changes, the recommendations of its previous report have been revised to some extent, and considerable new material has been added upon subjects not previously touched. There are some subjects upon which experimentation is still in progress, and the art of concrete and reinforced concrete will be advancing for many years to come.

While this report deals with every kind of stress to which concrete is subjected, and includes all ordinary conditions of proportioning and handling, it does not go into all types of construction nor all the applications to which concrete and reinforced concrete may be put. The report is not a specification, but may be used as a basis for specifications. In their use, concrete and reinforced concrete involve the exercise of good judgment to a greater degree than do any other building materials. Rules cannot produce or supersede judgment; on the contrary, judgment should control the interpretation and application of rules.

The Committee has not attempted in every case to present rigidly scientific methods of analysis in dealing with stresses, but has aimed to furnish rules which will lead to safe results sufficiently close for ordinary design.

CHAPTER II.

ADAPTABILITY OF CONCRETE AND REINFORCED CONCRETE.

The adaptability of concrete and reinforced concrete for engineering structures or parts thereof is so well established that they are recognised materials of construction. When properly used, they have proved satisfactory for those purposes for which their qualities make them particularly suitable.

1 USES.

Plain concrete is well adapted for structures in which the principal stresses are compressive, such as foundations, dams, retaining and other walls, tunnels, piers, abutments, and, in many cases, arches.

By the use of metal reinforcement to resist the principal tensile stresses, concrete becomes available for general use in various structures and structural forms. This combination of concrete and metal is particularly advantageous in structural members subject to both compression and tension, and in columns where, although the main stresses are compressive, there is also cross-bending.

Metal reinforcement may also be used to advantage to distribute and minimise cracks due to shrinkage and temperature changes.

2. PRECAUTIONS.

Failures of reinforced concrete structures have been due usually to some one or more of the following causes:—

Defective design, poor material, faulty execution, or premature removal of forms.

To prevent failures or otherwise unsatisfactory results, the following precautions should be taken:—

The computations and assumptions on which the design is based should be in accordance with the established principles of mechanics. The unit stresses and details of the design should conform to accepted good practice. Materials used for the concrete as well as for the reinforcement should be carefully inspected and tested, special attention being given to the testing of the sand, as poor sand has proved a frequent cause of failure. The measuring and combining of the materials which go to make up the concrete, and the placing of the concrete in the forms, should be under the supervision of experienced men. The metal for reinforcement should be of a quality conforming to standard specifications. Care should be taken to obtain good bond between different fills of concrete, to prevent concrete from freezing before the cement has set, to have the materials thoroughly mixed, to avoid too wet or too dry a consistency, and to have the forms cleaned before concrete is placed.

The computations should include all details; even minor details may be of the utmost importance. The design should show clearly the size and position of the reinforcement, and should provide for proper connection between the component parts so that they cannot be displaced. As the connections between reinforced concrete members are frequently a source of weakness, the design should include a detailed study of such connections.

The concrete should be rigidly supported until it has developed sufficient strength to carry imposed loads. The most careful and experienced inspection is necessary to determine when the concrete has set sufficiently for it to be safe to remove forms. Frozen concrete frequently has been mistaken for properly set concrete.

3. DESIGN AND SUPERVISION.

The execution of the work should not be separated from the design, as intelligent supervision and successful execution can be expected only when both functions are combined. It is desirable, therefore, that the engineer who prepares the design and specifications should have supervision of the execution of the work.

The Committee recommends the following practice for the purpose of fixing the responsibility and providing for adequate supervision during construction.

(*a*) Before work is commenced, complete plans and specifications should be prepared, giving the dead and live loads, wind and impact, if any, and working stresses, showing the general arrangement and all details. The plans should show the size, length, location of points of bending, and exact position of all reinforcement, including stirrups, ties, hooping, and splicing.

(*b*) The specifications should state the qualities of the materials and the proportions in which they are to be used.

(*c*) The strength which the concrete is expected to attain after a definite period should be stated in the specifications.

(*d*) Inspection during construction should be made by competent inspectors selected by and under the supervision of the engineer, and should cover the following:—

1. Materials.
2. Construction and erection of the forms and supports.
3. Sizes, shapes, arrangement, position, and fastening of the reinforcement.
4. Proportioning, mixing, consistency, and placing of the concrete.
5. Strength of the concrete by tests of standard test pieces made on the work.
6. Whether the concrete is sufficiently hardened before the forms and supports are removed.
7. Protection from injury of all parts of the structure.
8. Comparison of dimensions of all parts of the finished structure with the plans.

(*e*) Load tests on portions of the finished structure should be made where there is reasonable suspicion that the work has not been properly performed, or that, through influences of some kind, the strength has been impaired, or where there is any doubt as to the sufficiency of the design. The loading should be carried to such a point that the calculated stresses under such loading shall be one and three-quarter times the allowed working stresses, and such loads should cause no injurious permanent deformations. Load tests should not be made before the concrete has been in place sixty days.

4. DESTRUCTIVE AGENCIES.

(a) Corrosion of Metal Reinforcement.—Tests and experience indicate that steel sufficiently embedded in good concrete is well protected against corrosion, no matter whether located above or below water level It is recommended that such protection be not less than 1 in. in thickness. If the concrete is porous so as to be readily permeable by water, as when the concrete is laid with a very dry consistency, the metal may corrode on account of the presence of moisture and air.

(b) Electrolysis.—The experimental data available on this subject seem to show that while reinforced concrete structures may, under certain conditions, be injured by the flow of electric current in either direction between the reinforcing material and the concrete, such injury is generally to be expected only where voltages are considerably higher than those which usually occur in concrete structures in practice. If the iron be positive, trouble may manifest itself by corrosion of the iron, accompanied by cracking of the concrete, and if the iron be negative there may be a softening of the concrete near the surface of the iron, resulting in a destruction of the bond. The former, or anode effect, decreases much more rapidly than the voltage, and almost if not quite disappears at voltages that are most likely to be encountered in practice. The cathode effect, on the other hand, takes place even for very low voltages, and is, therefore, more important from a practical standpoint than that of the anode.

Structures containing salt or calcium chloride, even in very small quantities, are very much more susceptible to the effects of electric currents than normal concrete, the anode effect progressing much more rapidly in the presence of chlorine, and the cathode effect being greatly increased by the presence of an alkali metal.

There is great weight of evidence to show that normal reinforced concrete structures free from salt are in very little danger under most practical conditions, while non-reinforced concrete structures are practically immune from electrolysis troubles.

(c) Sea Water.—The data available concerning the effect of sea water on concrete or reinforced concrete are limited and inconclusive. Sea walls out of the range of frost action have been standing for many years without apparent injury. In many places serious disintegration has taken place. This has occurred chiefly between low and high tide levels, and is due, evidently, in part to frost. Chemical action also appears to be indicated by the softening of the mortar. To effect the best resistance to sea water, the concrete must be proportioned, mixed, and placed so as to prevent the penetration of sea water into the mass or through the joints. The aggregates should be carefully selected, graded, and proportioned with the cement so as to secure the maximum possible density;

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the concrete should be thoroughly mixed; the joints between old and new work should be made water-tight; asd the concrete should be kept from exposure to sea water until it is thoroughly hard and impervious.

(d) Acids.—Dense concrete thoroughly hardened is affected appreciably only by acids which seriously injure other materials. Substances like manure, that contain acids, may injuriously affect green concrete, but do not affect concrete that is thoroughly hardened.

(e) Oils.—Concrete is unaffected by such mineral oils as petroleum and ordinary engine oils. Oils which contain fatty acids produce injurious effects, forming compounds with the lime which may result in a disintegration of the concrete in contact with them.

(f) Alkalies.—The action of alkalies on concrete is problematical. In the reclamation of arid land, where the soil is heavily charged with alkaline salts, it has been found that concrete, stone, brick, iron, and other materials are injured under certain conditions. It would seem that the level of the ground-water in an extremely dry atmosphere such structures are disintegrated, through the rapid crystallisation of the alkaline salts, resulting from the alternate wetting and drying of the surface. Such destructive action can be prevented by the use of a protective coating, and is minimised by securing a dense concrete.

CHAPTER III.

MATERIALS.

The quality of all the materials is of paramount importance. The cement and also the aggregates should be subject to definite requirements and tests.

1. CEMENT.

There are available for construction purposes Portland, Natural, and Puzzolan or Slag cements.

(a) Portland Cement is the product obtained by finely pulverising clinker produced by calcining to incipient fusion, an intimate and properly proportioned mixture of argillaceous and calcareous materials, with no additions subsequent to calcination excepting water and calcined or uncalcined gypsum.

It has a definite chemical composition varying within comparatively narrow limits.

Portland cement only should be used in reinforced concrete construction, or in any construction that will be subject to shocks, vibrations, or stresses other than direct compression.

(b) Natural Cement is the finely pulverised product resulting from the calcination of an argillaceous limestone at a temperature only sufficient to drive off the carbonic acid gas.

Although the limestone must have a certain composition, this composition may vary within much wider limits than in the case of Portland cement. Natural cement does not develop its strength as quickly nor is it as uniform in composition as Portland cement.

Natural cement may be used in massive masonry where weight rather than strength is the essential feature.

Where economy is the governing factor a comparison may be made between the use of natural cement and a leaner mixture of Portland cement that will develop the same strength.

(c) Puzzolan or Slag Cement is the product resulting from finely pulverising a mechanical mixture of granulated basic blast-furnace slag and hydrated lime.

Puzzolan cement is not nearly as strong, uniform, or reliable as Portland or natural cement, is not used extensively, and never in important work; it should be used only for unimportant foundation work underground where it is not exposed to air or running water.

(d) Specifications.—The cement should meet the requirements of the specifications and methods of tests for Portland cement which are the result of the joint labours of special committees of the American Society of Civil Engineers, American Society for Testing Materials, American Railway Engineering Association, and other affiliated organisations, and the United States Government.

2. AGGREGATES.

Extreme care should be exercised in selecting the aggregates for mortar and concrete, and careful tests made of the materials for the purpose of determining the quality and grading necessary to secure maximum density[1] or a minimum percentage of voids. Bank gravel should be separated by screening into fine and coarse aggregates and then used in the proportions to be determined by density tests.

(a) Fine Aggregate should consist of sand, or the screenings of gravel or crushed stone, graded from fine to coarse, and passing when dry a screen having ¼-in. diameter holes;[2] it preferably should be of siliceous material, and not more than 30 per cent. by weight, should pass a sieve having 50 meshes per lin. in.; it should be clean, and free from soft particles, lumps of clay, vegetable loam, or other organic matter.

Fine aggregate should always be tested for strength. It should be of such quality that mortar composed of one part Portland cement and three parts fine aggregate by weight when made into briquettes, prisms, or cylinders will show a tensile or compressive strength, at an age of not less than seven days, at least equal to the strength of 1 : 3 mortar of the same consistency made with the same cement and standard Ottawa sand.[3] If the aggregate be of poorer quality, the proportion of cement should be increased to secure the desired strength. If the strength developed by the aggregate in the 1 : 3 mortar is less than 70 per cent. of the strength of the Ottawa-sand mortar, the material should be rejected. In testing aggregates care should be exercised to avoid the removal of any coating on the grains, which may affect the strength; bank sands should not be dried before being made into mortar, but should contain natural moisture. The percentage of moisture may be determined upon a separate sample for correcting weight. From 10 to 40 per cent. more water may be required in mixing bank or artificial sands than for standard Ottawa sand to produce the same consistency.

(To be continued.)

[1] A convenient coefficient of density is the ratio of the sum of the volumes of solid particles contained in a unit volume to the total unit volume.

[2] If the dividing size between the fine and coarse aggregate is less or greater than ¼ in., allowance should be made in grading and proportioning.

[3] A natural sand obtained at Ottawa, Illinois, passing a screen having 20 meshes and retained on a screen having 30 meshes per linear inch; prepared and furnished by the Ottawa Silica Company, for 2 cents per pound f.o.b. cars, Ottawa, Illinois.

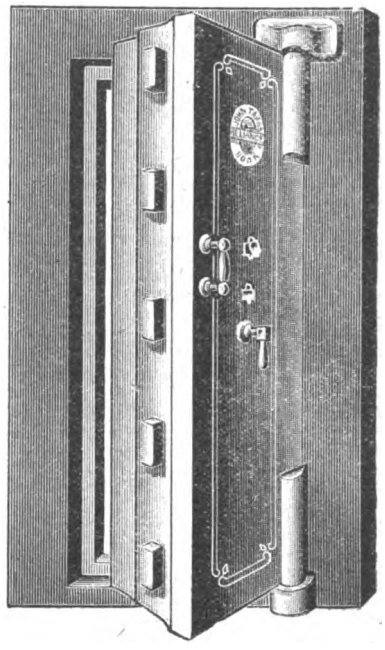
JOHN TANN'S SAFES, DOORS AND STRONG ROOMS.

It is the well-sustained claim of John Tann, Limited, that no fire-resisting safe of their make has ever had its contents destroyed by fire, and that no thief-resisting safe they have supplied has ever been opened by a burglar. The firm is also the oldest established of its kind in the world, having been founded in 1795, and the history of its development, and never-failing pursuit of every improvement, or modification rendered necessary by changing circumstances, is a very interesting one. Its latest achievement, for instance, has been the devising of means to frustrate the possible employment by the burglar of the oxy-acetylene blowpipe.

With such credentials it is little wonder that the leading bankers, merchants, and others with valuable property to protect, have with confidence availed themselves of the perfect security John Tann's safes guarantee. We have been much interested in one of the firm's latest productions, a high-grade bullion-room door, constructed for the Trustees of Queensland, to resist fire, the drill, the wedge, the oxy-acetylene blowpipe, high explosives, and every other known means of attack, a series of illustrations of which are before us and can be had on application by any reader, together with the firm's latest catalogue, by application to 117, Newgate Street, E.C.

We should also mention that at Blackfriars House, which we illustrated in our New Year's number, thirteen of their "List 13" doors have been installed. Of one of these we give an illustration.

The door is 1½ ins. thick in the thinnest part, the outer surface being composed of John Tann's drill-proof unbreakable plate, lock chambers constructed of Steel T bars, 6 by 4 by ½ ins. Steel angle bar frame, 6 by 6 by ½ ins., with 4½ by 3 by ½ ins. angle bar rebate, with ½ in. packing bar. Each door has five sliding bolts at front, which pass through the T girder lock case and lock behind the angle bar rebate in frame. The bolts are secured by two of John Tann's patent, unpickable, gunpowder-proof bank locks, the locks and lockwork being protected by an additional thickness of drill-proof plate, making a total thickness of 2¼ ins. The back of the door is secured by John Tann's continuous tongue bar. The "List 13" doors have a chamber at back filled with the best-known steam generating composition. The other doors in Blackfriars House, "List 8" and "List 7," specially adapted for large



John Tann's "List 13" Door.

fire-resisting rooms in basements. The ventilating gates or grilles for the strong rooms are also all by John Tann, Limited, and of wrought steel.

It will be remembered that to John Tann, Limited, was entrusted the making of the safe on board the "Medina" for the Crown and Royal jewels worn by the King and Queen during their visit to India in 1911. Among the more recent of the hundreds of testimonials which the firm possesses is one of very timely interest from a well-known East End firm of goldsmiths, whose shops were raided by the mob in the recent anti-German riots in mistake. The rioters, after clearing the shop windows and show-cases of watches and jewellery, carried off the clocks and every article of value, and then turned their attention to the safe, which, although it weighed 7 cwts., was actually carried out bodily by a gang of burly ruffians, who crashed it down on the pavement time after time, but without effect. They then brought hammers and chisels into play, but all in vain. An inferior safe must have yielded to such savage attacks, but they could make no impression on the safe in question, although they smashed off the hinges and handles, and, in fact, made every possible effort to open it. It foiled every attempt, and was found with its valuable contents intact, and is as serviceable as ever.

Plans have been approved for a side chapel at St. Peter's Church, Swinton, Manchester.

The *Journal* of the Imperial Arts League states that information has been received that Mr. Alfred Gilbert, the sculptor, is alive and well and working in Bruges. His friends, who have feared greatly for his safety, have failed up to now in all their efforts to trace him, the Germans having forbidden the making of inquiries of any kind in Bruges. The information now obtained has come through the kind intervention of the King of Spain.

LEGAL INTELLIGENCE.

THE EUSTON ROAD BUILDING LINE.—THE KING V. THE TRIBUNAL OF APPEAL, EX PARTE THE LONDON COUNTY COUNCIL.—Before the Lord Chief Justice and Justices Ridley and Lush, on January 15-16, this matter was argued on a rule nisi for order to state a case, a rule having been obtained by the London County Council directed to the Tribunal to show cause why they should not state a case for the opinion of the Court. Mr. Macmorran, K.C., and Mr. A. A. Bethune, on behalf of the Metropolitan Railway Company, appeared to show cause against the rule, the railway company having obtained a decision of the Tribunal as to the building line in the portion of Euston Road in which they were interested. Mr. W. Craig Henderson appeared in support of the rule.—Mr. Macmorran said: In this case his clients had been before that Tribunal, and they had fixed a line. The railway company now appeared to show cause against the rule obtained by the Council being made absolute. His contention was that there was no question of law raised here, but that it was entirely a question of fact, and upon that ground the Tribunal refused to state a case. The facts were that certain owners were desirous of building in the Euston Road between Diana Place and Fitzroy Place. The superintending architect of the London County Council fixed the building line for that portion of the road. The matter went before the Tribunal, and they came to the conclusion that there were different lines of frontage in different parts of this long length of road. They said in effect that there was no building line from that portion in which his clients' station stood.—The Lord Chief Justice: You say you can have a street made up of four or five general building lines?—Mr. Macmorran: Yes.—Mr. Henderson having spoken, the Court expressed the opinion that a case must be stated for the opinion of the Court on the first two grounds upon which the rule was stated—viz. (1) Whether in these proceedings the Tribunal were entitled to define the general line of buildings between the points A and C on the plan, and (2) whether the Tribunal were right in determining that there was no general line of buildings between the points A and C.—The Lord Chief Justice said the Court now only decided that it was not made clear to it that no point of law arose. The order nisi was made on three grounds, and they made the order absolute, but they did not decide that the third point—viz., whether the Tribunal were entitled to determine in what street or streets the buildings to the west of the point B were situate or to determine that such buildings were not in the Euston Road at all, arose between the railway company and the other parties, and the third ground did not affect that.

A JESMOND BUILDER'S AFFAIRS.—At Newcastle Bankruptcy Court, last Thursday, Mr. Swinburn Wilson applied, on behalf of John Foster Dixon, builder, of Mildmay Cottage, West Jesmond, for discharge from bankruptcy.—The Official Receiver (Mr. Chas. Woollett) said the date of the bankruptcy was November 3, 1916, the liabilities were £3,600, and the deficiency £1,719.—Mr. Wilson pointed out that this man had been in business for sixteen years, with a turnover of £20,000 a year. On the question of unjustifiable extravagance, he mentioned that although for five or six years he had drawn from the business more than he should, he drew less than he might have done afterwards. Books had been kept properly, and on paper there was a surplus of several thousand pounds. He had put £1,200 into a printing business which collapsed, and in another speculation he lost £600, also at this time, and he lost his head. He (Mr. Wilson) could put in no excuses for the betting, except that it was part of his sport when he was well off. When the time came that he felt he could not "stand up" in Newcastle, he lost his head, went to Blackpool, and gave way to drink. There had been a dividend of 5s. 11½d. The creditors' meeting would probably have accepted 5s. On the allegation of fraud, he put in two letters from two of those stated to have been defrauded, stating their view that there was no intent to defraud.—The Official Receiver stated that he had placed the facts before the Board of Trade, recommending that proceedings be left to the creditors if they cared to take them. No action had been taken.—The Judge: That practically means the withdrawal of the charge of fraud.—His Honour granted the discharge, subject to a suspension of three years.

The death has taken place at Windsor of Mr. Robert Palmer, at the age of eighty-four years. He was employed at the Castle as a carpenter for nearly half a century.

Correspondence.

LOCAL AUTHORITIES AND SECTION 15 OF THE HOUSING AND TOWN PLANNING ACT.

To the Editor of THE BUILDING NEWS.

Sir,—I have read with interest your comments in THE BUILDING NEWS upon Dr. R. T. Edwards's recommendation that local authorities should resort to the provisions of Section 15 of the Housing and Town Planning Act, 1909, in preference to enforcing the powers conferred upon them by Sections 17 and 18.

Your remarks, however, infer that there is an obligation upon the owners of property to give sufficient notice to the local authority of prospective changes in tenancies of small cottages, but I am unable to find anything in the Act which lays such responsibility upon them.

Section 14 of the Act provides that "there shall be implied a condition that the house is at the commencement of the holding in all respects reasonably fit for human habitation," and Section 15 states that it shall be so kept during the holding. That liability is clearly the owner's, but it would appear that the local authority can only ascertain whether a cottage is in a fit state or not by occasional inspections after proper notice being given to the tenant as specified by the Act.—Yours truly,

D. J. JONES.

"Delamere,"
Pitshanger Road, Ealing, W.

Building Intelligence.

MONAGHAN.—The County Monaghan Sanatorium, situate close to the town on the old Armagh Road, has just been completed and will be opened shortly. The building, which is a fine substantial structure, has recently been remodelled and improved throughout. It has been used since 1840 as the County Monaghan Fever Hospital, but the county council took it over last year for the above purpose, and over £2,000 has now been expended on it. All the new work was carried out from plans and specifications prepared by Mr. J. J. Hannigan, B.E., county surveyor for Monaghan, who also supervised the work of the several departments during the reconstruction.

TRADE NOTES.

Boyle's latest patent "Air-Pump" Ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, E.C., have been adopted for the Board-room, Midhurst Rural District Council, Midhurst.

Messrs. William Shepherd and Sons, Ltd., are laying with their Reli Tar Paving the whole of the surroundings of the new canteen which has been erected for the benefit of the employees at Messrs. Crossley Motors, Ltd., Works, Openshaw, Manchester.

The Carshalton Urban District Council have been asked by the Local Government Board to submit details and a formal application for sanction to a loan of £20,000 for a housing scheme.

The Hawick Town Council propose to extend the Anderson Sanatorium at an estimated cost of £1,350. A start will be made with the work as soon as the sanction of the Local Government Board and the Treasury is obtained.

Mr. Robert Williams, of 24, Harthill Avenue, Liverpool, builder, formerly of Berwyn, Woodlands Road, Aigburth, Liverpool, who died on October 15 last, lest estate of the gross value of £11,184, of which £664 is net personalty.

Venice is about to erect a new monumental church, dedicated to Our Lady, on the Lido, to thank her for having so far preserved the city from grave disasters from air and sea attacks, and to beg her intercession for a continuance of the same favour. Considerable sums of money have already been offered for the new building, which will be begun almost immediately.

Our Office Table.

Some time ago the Edinburgh Town Council accepted the offer of Sir Robert Maule to complete the decoration of the frieze panels in the Council Chamber. He commissioned Messrs. George Dobie and Son, decorators, George Street, Edinburgh, to execute the work. The first portion has now been put in place. The frieze carries on the heraldic history of Scotland, the note for which was furnished by the panel over the fireplace, on which are painted the arms of the Scottish Kings. In each of the frieze panels there are two shields containing the arms of the Queens treated in subdued heraldic colouring on a background of conventionally treated thistles in soft tones, with an intertwining ribbon, on which are the respective names and dates.

Experiments have been conducted at the Lewis Institute in Chicago to determine the effectiveness of manure as a protective covering for freshly-laid concrete to prevent disastrous results in cold weather. In these tests slabs of concrete exposed to outdoor conditions were covered with 2, 4 and 6 inches of fresh manure obtained from a livery stable. The results proved that the 4 and 6 inch layers had high protective qualities and were sufficient to afford the concrete a protection against a drop of 25 or 26 degrees in temperature. The 4-in. layer seemed to be as effective as the 6-in., and appeared to be an ample protective covering against a temperature of 12 degs. F. The manure should not be allowed to come in direct contract with the freshly-laid concrete, but should be kept clear by the insertion of building paper, or even newspaper between the concrete and covering.

As a sample of the good work which the Imperial Arts League is doing for members, we are glad to note the following. An artist was commissioned in 1904 to produce a statuette to form part of a fountain erected in a public park. In 1915 it was found that reproductions of the statuette were being produced and distributed for sale by an influential firm of modellers. The firm had acted in good faith, but after negotiations between solicitors the artist recovered substantial damages and his costs and all existing reproductions were handed over to him.

An experience of Mr. Louis Raemaekers is recalled by a prominent member of the Liverpool Arts Committee. The cartoonist, well knowing the hostility shown by the Germans towards him, had approached with his usual sang-froid the sentries on the German frontiers, and, among other matters, inquired if they had ever heard of Raemaekers, the Dutchman. The answer was significant. "We should think so, and it would be worth 12,000 marks to any of us who could effect his capture, dead or alive, it would not matter. And he calls himself a neutral."

The London County Council has extended for another year the period of office of the undermentioned district surveyors who have passed the retiring age limit:—Mr. F. Hammond (district of Hampstead), Mr. H. Lovegrove (district of Islington, South, and Shoreditch), and Mr. F. W. Hamilton (district of Paddington). Also for another year Mr. J. Goodchild, interim district surveyor for the district of Islington (North), and Mr. A. W. Tanner, interim district surveyor for the district of St. George-in-the-East. These two officials have passed the retiring age limit, but their services have been retained for several years past in a temporary capacity. Also to Mr. E. A. Young, district surveyor for the district of Catford, and interim district surveyor for the district of Camberwell (North), continuing to give lectures at the Camberwell School of Arts and Crafts until July 31, 1917. Also to Mr. E. A. Young, district surveyor for the district of Catford, continuing to act during the pleasure of the Council as interim district surveyor for Camberwell (North). Also, under Section 142 of the London Building Act, 1894, to the appointment of deputy district surveyors in thirteen cases.

It is proposed to build a new town hall at Geelong West, Victoria, at a cost of £8,834.

TO ARMS!

1st LONDON ENGINEER VOLUNTEERS.

Headquarters, Balderton Street, Oxford Street, W.

ORDERS FOR THE WEEK, BY LIEUT.-COL. C. B. CLAY, V.D., COMMANDING.

OFFICER FOR THE WEEK.—Platoon Commander G. H. Parker.

NEXT FOR DUTY.—Platoon Commander C. H. C. Bond.

MONDAY, January 29.—Technica' for Platoon No. 9 at Regency Street. Squad and Platoon Drill, Platoon No. 10. Signalling Class. Recruits Drill, 6.30—8.

TUESDAY, January 30.—A Volunteer fatigue party is required to assist the Quartermaster.

WEDNESDAY, January 31.—Instructional Class, 6.15. Platoon Drill, Platoon No. 1.

THURSDAY, February 1.—Platoon Drill, Platoons Nos. 5 and 6. Ambulance Class by M.O., 6.30.

FRIDAY, February 2.—Technical for Platoon No. 10, Regency Street. Squad and Platoon Drill No. 9. Signalling Class. Recruits Drill, 6.25—8.25.

SATURDAY, February 3.—Commanding Officer's Parade. 2.45, Uniform.

SUNDAY, February 4.—Entrenching at Otford, Parade Victoria (S.E. and C. Railway Booking Office) 8.45 a.m. Uniform, haversacks, water-bottles. Mid-day rations to be carried. Railway vouchers will be provided.

MUSKETRY.—For all Companies, see Notice at Headquarters.

NOTE.—Unless otherwise indicated, all Drills, etc., will take place at headquarters.

By order,
MACLEOD YEARSLEY, Adjutant.

January 27, 1917.

CHIPS.

At the annual meeting of the Bath Master Builders' Association it was decided to give all workmen a halfpenny per hour special war bonus.

The Leeds Corporation propose to adapt Farfield House, Armley, as a training home for mentally defective women, at a total estimated cost of £324.

Mr. Alphonso Lambert, a Southport artist, died last Wednesday in his 100th year. He was a friend of President Faure, who visited him on many occasions.

The Newton-in-Makerfield Urban District Council have passed plans submitted by the surveyor for the conversion of the offices of the old gasworks into a residence.

At a metal works near Deusto, in Spain (says a Bilbao telegram), a mass of reinforced concrete collapsed on top of a gang of workmen. Three dead and six injured have been extricated from beneath the débris, but there are still a number of men missing.

The church which Father Ryan, O.M.I., has been building at the Leper Station outside Pretoria (Transvaal) was formally opened on December 12. For somewhat over £800 Father Ryan has put up quite a substantial building, to accommodate about 300 worshippers. The church is dedicated to the Immaculate Conception.

A White Paper issued last Wednesday gives the final account of expenditure under the Land Registry (New Buildings) Act, 1900. In 1915-16 there were no further issues from the Consolidated Fund, and the unissued balance remains at £18,500. The total expenditure of £242,676 is £22,323 less than was authorised by the Act.

Mr. David Leslie, the oldest Freeman and pensioner of the Glaziers' Company, completed recently his 100th year. He was admitted to the freedom in 1839. The company, at their last meeting, passed a resolution of congratulation, and voted a gift of "one hundred crowns." The Lord Mayor sent to Mr. Leslie a message conveying his good wishes.

Mr. John Jessop Hardwick, an Associate of the Royal Society of Painters in Water-Colours, has died at Thames Ditton at the age of eighty-five. Mr. Hardwick, who was elected an Associate of the Royal Society of Painters in Water-Colours in 1882, at one time assisted Mr. John Ruskin in his drawing classes at the Working Men's College.

An interesting variety of subjects were included in the Birmingham Archæological Society's programme at the annual open meeting last Wednesday night. Mr. T. G. Barnett exhibited, and read a paper on, a display of ancient finger-rings; Professor Granville Bantock described the Melvill Book of Roundels, dated 1612, and accompanied his description by illustrations on the harpsichord; and Mr. T. J. Davies read a paper on Stoneleigh Abbey, illustrated by lantern slides. In addition, there were exhibits of pencil drawings of old buildings in the Midlands, primitive musical instruments, and Westley's copperplate of plan of Birmingham.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C., and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

***Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.

Telephone: Gerrard 1291.
Telegrams: "Timeserver, Estrand, London."

NOTICE.

Bound Copies of Vol. CX. are now ready, and should be ordered early (price 12s. each, by post 12s. 10d.), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XLI., XLVI., XLIX., LIII., LXI., LXII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXXI., LXXII., LXXIII., LXXIV., LXXV., LXXVI., LXXVII., LXXIX., LXXX., LXXXI., LXXXII., LXXXIII., LXXXIV., LXXXV., LXXXVI., LXXXVII., LXXXVIII., LXXXIX., XC., XCI., XCII., XCIII., XCIV., XCV., XCVI., XCVII., XCVIII., XCIX., C., CI., CII., CIII., CIV., CV., CVI., CVII., CVIII., and CIX., may still be obtained at the same price; all the other bound volumes are out of print.

BACK ISSUES.

Most of the back issues are to be had singly. All back issues over one month old will be charged 6d. each, postage 1d. Subscribers requiring back numbers should order at once, as they soon run out of print.

Handsome Cloth Cases for binding the BUILDING NEWS, price 2s., post free 2s. 5d., can be obtained from any Newsagent, or from the Publisher, Effingham House, 1, Arundel Street, Strand, W.C.

ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight Words, the first line counting as two, the minimum charge being 5s. for four lines.

The charge for Auctions, Land Sales, and Miscellaneous and Trade Advertisements (except Situation Advertisements) is 6d. per line of Eight Words (the first line counting as two), the minimum charge being 4s. 6d. for 50 words. Special terms for series of six insertions or more can be ascertained on application to the Publisher.

RECEIVED.—E. J. and A. T. B.—C. P. and Co.—R. and R.—W. H. J. and Son—J. C. and Son—Capt. D. G.—L. F. Co., Ltd.—P. B. and P.—J. C. S.—H. B. and Co.—N. and Co., Ltd.—J. H. H. and Co.—H. W.—B. J. Co., Ltd.

W. H. S.—Yes.

S. M.—Thanks; no.

P. T. W.—Received too late.

PUPIL.—The "diploma" is not worth the paper it is printed on.

W. T. M.—We know nothing of either firm. Those to be relied on will be found in our "Directory" pages.

£6,698 was awarded by the War Losses Commission to a Gloucester firm of timber merchants whose premises were requisitioned by the War Office, and who claimed £15,217.

The Lady Emily Lutyens, National Representative of the Order of the Star in the East (Hampstead Centre), will deliver a public lecture at the Oriel Hall, Hampstead (close to Hampstead Tube Station), on Monday, January 29, at 8 p.m. Subject, "Behold I Shake all Nations, and the Desire of all Nations Shall Appear." Collection to defray expenses.

Many will regret to learn that Mr. Edward Sweney, who for some years held the post of plan examiner at the Ordnance Survey office at Bristol, died of fever at Seremban on the 17th ult. Mr. Sweney severed his connection with the Ordnance Survey Department in August, 1898, on receiving a Colonial Office appointment as staff surveyor in the State of Negri Sembilan, where he was subsequently appointed chief surveyor and invested with the powers of a magistrate. The deceased gentleman was 54 years of age.

FOR
Olivers' Seasoned Hardwoods,
APPLY TO—
WM. OLIVER & SONS, Ltd.,
120, Bunhill Row, London, E.C.

TENDERS.

***** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.**

BOSTON (LINCS.).—For supply of about 8,637 tons of granite and 946 tons of slag, for the rural district council.

Accepted tenders:—Enderby and Stoney Stanton Granite Co., Ltd., Enderby, Leicester; Groby Granite Co., Ltd., Groby, Leicester; Holwell Iron Co., Ltd., Ashfordby, Melton Mowbray. Various prices.

GREAT YARMOUTH.—For work at Surrey Lodge, for the guardians:—

Carter and Wright	£34 0 0

(Accepted.)

GREENWICH.—For additional steam, exhaust and condensing water piping, etc., required in connection with the third new turbo-generator to be installed at Greenwich generating station, for the London County Council:—

Brightside Foundry and Engineering Co., Ltd., Victoria Street, S.W.*	£5,527 0 0
John Spencer, Ltd., Wednesbury	7,055 0 0
Babcock and Wilcox, Ltd., Farringdon St., E.C. (incomplete)	5 943 0 0

*Accepted, with the addition of £140 for thicker plates for the large circulating water-pipes. Also sanctioned additional £235 for steam pipes with riveted flanges, and for valves of a type different from that originally specified.

HOLMFIRTH.—For laying new branch sewer from Dobb Lane to Stanley Street, for the urban district council:—

R. Turner and Co. (accepted).

LONDON, S.E.—For supply of stoneware drain pipes, bends, etc., for the Camberwell Borough Council:—

Addington Timber, Slate, and Cement Co., Ltd., at standard list prices, less 10 per cent. net (recommended for acceptance).

LONDON.—Repair of roofs of 14 and 15, Lee Street, for the Shoreditch Borough Council:—

Messrs. Killby and Gayford, Ltd.	£395 0 0
Mr. H. Nelson	279 10 0
Messrs. R. Marshall and Son ..	263 0 0
*Messrs. A. and T. Wilson, 5, York Row, Kingsland Road, N.E.	206 10 0

LONDON.—For repairs to 101, Haggerston Road, for the Shoreditch Borough Council:—

*H. Nelson, New North Road, N.	£112 15 0

NEWHAVEN.—For supply of broken flints, for the rural district council:—

Hudson's, Ltd. (per yard)	8s. 6d.

(Accepted.)

SHEFFIELD.—Painting work at the Corporation Baths, for the T.C.

Tenders accepted.—Baths: Corporation Street, F. A. Tinker and Sons, £180; Brightside: Simpson and Melling, £275; Glossop Road: Simpson and Melling, £122; Upperthorpe: E. Hudson, £28 10s.; Park, E. Hudson, £38.

SUNDERLAND.—Alterations and repairs to the Thomas Street School, for the Education Committee:—

Joseph Huntley and Son (accepted).

WIMBORNE.—For rebuilding the kitchen chimney of the workhouse, for the B.G.:—

*C. H. Green	£42 16 0

WEST ASHFORD.—Alterations and improvements at the Sanatorium, for the R.D.C.:—

J. Day and Son, Ashford ..	£350 0 0
S. Howland, Ashford	£398 0 0
Saunder and Co., Canterbury ..	£315 16 8
H. Knock, Ashford	379 14 9
*E. J. Miles, Charing	222 15 6

*(Accepted.)

WEYMOUTH.—For strengthening stone steps at the pile pier, for the town council:—

A. E. Whettam	£144

(Accepted.)

A memorial window has been fixed in Deeping St. Nicholas parish church to the memory of the vicar's son-in-law, Major W. L. Hawkesley, M.B., of the R.A.M.C., who was killed on the French front in April last. The window, which is the work of Mr. T. Curtis, of Messrs. Ward and Hughes, Frith St., Soho, W., has been placed above the altar. It depicts the dead officer on the battlefield assisting a wounded soldier, with the Great Healer hovering above waiting to place a crown upon his head.

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COMPETITIONS OPEN.

March 3.—Water Supply and Sewerage Scheme (premium 5,000 pesetas—about £200), Manzanares, Spain.—Secretaria del Ayuntamiento, Manzanares.

LIST OF TENDERS OPEN.

BUILDINGS.

Feb. 28.—New bathrooms, lavatories, etc., at the Louth County Infirmary.—J. W. Turner, J.P., Secretary, Louth County Infirmary.

ENGINEERING.

Feb. 2.—Supply and erection of fan draught cooling towers at Stuart Street station, for the Manchester Electricity Committee.—Chairman of the Electricity Committee, Town Hall.

Feb. 6.—Supply and erection of two 15-16 b.h.p. gas engines (Crossley, National, Stockport, or Tangye), and two stereophagus pumps at their eastern sewage works.—For the Woodford Urban District Council.—W. Farrington, Surveyor, Council Offices, Woodford Green.

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

FENCES AND WALLS.

March 30.—Wrought-iron Gates and Fencing, for the Central Wharf and Quay Street Landing, Auckland, N.Z.—For the Harbour Board.—The Commercial Intelligence Department, 73, Basinghall Street, E.C.

PAINTING.

Jan. 27—Feb. 1.—Painting, cleaning, etc., to the laundry and engine-house at the Newington Institution, Westmoreland Road, S.E.—For the Southwark Board of Guardians.—S. Wood, Clerk, Guardians Offices, Ufford Street, Blackfriars, S.E.

Feb. 7.—For Painting at various places.—For the Lancashire and Yorkshire Railway Company.—R. C. Irwin, Secretary, Hunt's Bank, Manchester.

ROADS AND STREETS.

Jan. 27.—Completion of a new road from Ellesmere Port to Netherpool.—For the Ellesmere Port and Whitby Urban District Council.—T. W. Francis, Clerk, Council Offices, Ellesmere Port.

Jan. 29.—British Macadam, West End, Hants.—For the South Stoneham Rural District Council.—Mr. E. Wynter Cross, Clerk, West End, Hants.

Jan. 30.—Whinstone (broken and unbroken) and limestone and also tarred slag and whinstone for macadamizing purposes (One Year) in such quantities as surveyor shall from time to time direct.—For the Middlesbrough Rural District Council—W. Richardson, Clerk for highway purposes, Stokesley.

Jan. 31.—Broken Stone, Chippings, and Tarred Macadam (One Year).—For the Neston and Parkgate Urban District Council.—Surveyor, Town Hall, Neston.

Jan. 31.—Setts, Kerbs, and Flags, Granite Macadam, Pitch and Tar, Slag Dust, Tar-Macadam, Limestone Macadam, Brushes (One Year).—For the Otley Urban District Council.—O. Holmes, Surveyor to the Council.

Feb. 1.—Materials (one year) for the Canterbury Roads and Survey Committee.—A. C Turley, A.M.I.C.E., City Surveyor, Municipal Offices, Canterbury

Feb. 1.—Hand-picked Field Stones and Portland Gravel to the several parishes in the district.—For the Westbourne Rural District Council.—H. Norris, Surveyor, West Ashling, Chichester.

Feb. 3.—About 4,643 tons of Granite (X, XX, and XXX), and about 1,807 tons of Slag, etc. (2½ in. and 1¾ in.), to be delivered between April 1 and October 31 next, in quantities and at such times as the Council or their Surveyor shall direct.—For the Horncastle (Lincs) Rural District Council.—J. E. Chatterton, Clerk, Council Offices, Horncastle.

Feb. 5.—About 8,000 tons of Stone for macadamising the main roads, to be delivered at the several railway stations and wharves in the Riding.—For the Highways and Bridges Committee of the East Riding County Council.—Clerk of the County Council, County Hall Beverley.

Feb. 5.—Broken Granite, 4 by 5 Granite Setts, Tar Macadam, Granite, Limestone and Slag Chippings, Grit Kerbs, Stoneware Pipes and Gullies, Cement, Steam Road Rolling and Scarifying, Disinfectants, Pitch and Oil, Hardware, Brooms and Tools.—For the Little Hulton Urban District Council.—J. H. Heyes, Clerk, Council Offices, Little Hulton, Bolton.

Feb. 5.—Tar Macadam and Broken Slag.—For the Sutton-in-Ashfield Urban District Council.—J. D. Fidler, Clerk, Forest Street, Sutton-in-Ashfield.

Feb. 7.—Black Rock, Granite, Flint, or other approved road stone (marked samples to be deposited free of cost in Dog Lane Corporation Yard, Bath); Black Rock Gravel (marked sample required); Portland Cement (marked sample required); Fine and Coarse Sea Sand (marked sample required); Staffordshire bar iron; Lubricating Oils, etc.—(One year.)—For the Bath City Council.—City Surveyor's Offices, Bath.

Feb. 7.—7,500 tons (more or less) of 2-in. and 1½-in. hand-broken basalt for road construction, and 500 tons (more or less) of ⅝-in. clean chippings, to be delivered from the various stations in Middlesex.—For the Middlesex County Council.—Clerk, County Council, Middlesex Guildhall, Westminster

Feb. 7.—Whinstone, Slag, etc., according to order, delivered free at various railway stations, etc., in and adjacent to the district.—For the Easingwold Rural District Council.—F. J. H. Robinson, Clerk, Board Room, Workhouse, Easingwold.

Feb. 9.—About 5,800 tons of Granite, about 5,400 tons of Slag, about 550 tons of Slag Chips, and about 200 tons of Tar-Macadam, to be delivered to various stations and wharves in the district.—For the Caister (Lincs.) Rural District Council.—A. A. Padley, Clerk, Council Offices, Caistor.

Feb. 9.—Granite, Flints, Kentish Ragstone, Tar Macadam, Gravel, Chalk, etc.; haulage of materials from railway stations, etc., cartage of materials from depots; team labour by the day and hour; supply of tools, oils, etc., fuel, bricks, cement, iron and stoneware pipes, etc., tar-washing surfaces of roads and paths (one year).—For the Reigate Rural District Council.—F. C. Morrison, Clerk, 46, High Street, Reigate.

Feb. 9.—Granite, Tarred Granite and Slag, Gravel, Flints and Hoggin, hauling and purchase of Road Sand and Sweepings (one year).—For the Uxbridge Rural District Council.—C. Woodbridge, Clerk, 38, High Street, Uxbridge.

Feb. 10.—Surface tarring approximately 1,250,000 square yards of main roads with refined tar during ensuing spring and summer.—For the Hertfordshire County Council.—J. S. Killick, County Surveyor, Hatfield.

Feb. 12.—Supplying, breaking, and carting stone required for the maintenance of the county roads (one year).—For the Northumberland County Council Bridges and Roads Committee.—County Surveyor, Moothall, Newcastle-on-Tyne.

SANITARY.

Jan. 26.—Scavenging.—For the Sedgefield Rural District Council.—J. W. Lodge, Clerk, Council Offices, Sedgefield, Ferryhill.

Jan. 27.—Scavenging (one year).—For the Holywell Urban District Council.—J. K. Roberts, Clerk, Town Hall, Holywell.

Feb. 6.—Emptying and Removing Contents of Ashpits, etc., and Removal of House Refuse (One, Two, or Three Years), Old Hill, Staffs.—D. Wright, Clerk, Council House, Old Hill.

STEEL AND IRON.

Jan. 31.—Mild Steel or Iron Gates and Fencing for Quay Street Frontage, Auckland, N.Z.—For the Harbour Board.—Messrs. W. and A. McArthur, Ltd., Canberra House, 18-19, Silk Street, Cripplegate, E.C.

STORES.

Jan. 27.—Sanitary pipes, etc. (One Year).—For the Bishop Auckland Urban District Council.—J. T. Proud, Clerk, Town Hall Buildings, Bishop Auckland.

Jan. 27.—Sundry stores (quantities and particulars to be had on application to Borough Surveyor) for period ending December, 1917.—A. Robertson, Town Clerk, Douglas, Isle of Man.

Feb. 1.—Annealed Scoriæ (broken); bricks, castings; concrete flags and kerbs; Portland cement, pitch and tar; sanitary pipes, gullies, junctions, etc.; slag (broken); coal (for domestic use only), coke; timber; whinstone and granite (broken); and whinstone and granite setts and kerbs.—For the Middlesbrough Corporation.—P. Kitchen, Town Clerk, Municipal Buildings, Middlesbrough.

Feb. 2.—Gullies, Lamp Pillars, Lanterns, Paving, Kerbing, Channelling and Pitching, Disinfectants, Broken Syenite, Broken Limestone, Chippings, Gravel, Tar Macadam, Refined Tar, Manhole Covers, Ventilating Gratings, Charcoal Baskets and Step Irons (one year).—For the Swansea Town Council.—Borough Surveyor, Guildhall, Swansea.

Mr. William Wilkinson, chief sanitary inspector at Derby for the past twenty-eight years, and a president of the Sanitary Inspectors' Association, has died at the age of fifty-nine years.

The bronze statue of Mr. Gladstone was unveiled in Edinburgh last Thursday by Lord Rosebery. The work of Mr. Pittendrigh Macgillivray, R.S.A., it represents Gladstone in his robes as Chancellor of the Exchequer. It stands in George Street, facing towards Princes Street.

The new Claims and Record Office for Unemployed Insurance which has been erected on the plot of market gardens between Defoe Avenue and the River Thames at Kew is nearing completion. The offices are one-storey high, and cover nearly two acres and a-half. Some of the rooms are of immense size—one, the ledger-room, being 380 ft. long and 100 ft. wide.

The Ystradgynlais Rural District Council's new council offices in Glanley Street have been opened, the ceremony being performed by Mr. Thos. Watkins, who has been surveyor to the council and its predecessor, the Ystradgynlais District Highway Board, for a period of thirty years. The death is announced of Mr. John Edward Swift, surveyor to the Penistone Urban District Council. He was appointed by the old local board in 1891.

A strike of painters exists in Dundee in regard to hours and wages. The men, who are at present paid 10½d. per hour, wish an increase of 1½d., making the wage 1s. per hour, and further ask that the allowance for country work be increased from 6s. to 10s. per week, and that for overtime double time be paid instead of time and a-half. They also request an eight hours' instead of a nine hours' day. The masters offer to increase the wages ½d. per hour and to submit the question generally to arbitration, but the men refuse to consider this, and 200 are affected by the strike.

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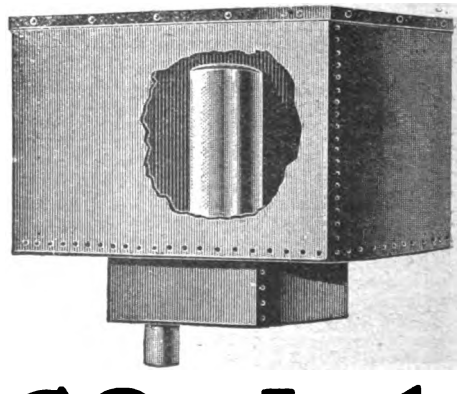

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January 31, 1917. Volume CXII.—No. 3239.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.

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OUR ILLUSTRATIONS.

University College of South Wales and Monmouthshire, Cardiff. Mr. William D. Caröe, M.A., F.S.A., F.R.I.B.A., Architect.

Detail of Arbour Square front, Stepney Municipal Buildings. Premiated design. Messrs. Ambrose Poynter, F.R.I.B.A., and George Wenyon, M.S.A., Architects.

The James Smith Memorial, Wallasey, Cheshire. Messrs. Briggs, Wolstenholme and Thornely, FF.R.I.B.A., Architects.

The Row of Almshouses, Marshfield, Gloucestershire, sketched by Mr. Maurice B. Adams, F.R.I.B.A.

Cottage at Longfield, Kent. Elevations, sections, and plans. Mr. Sidney K. Greenslade, A.R.I.B.A., Architect.

Detail of New Premises, High Holborn, W.C. Elevation and section. Mr. Leonard Martin, F.R.I.B.A., Architect.

Currente Calamo.

The waste in war is enormous, and the commandeering of hotels as temporary offices for the Government has become so patent that the Government has had to appoint a Committee to consider future demands for accommodation from any Department and determine its allocation. As all the members are more or less interested in obtaining such, except the First Commissioner of Works, we doubt whether its efforts will save much. So far, at any rate, economy of space apparently has been little studied, or the possibility of finding quarters without the necessity of erecting new buildings on unoccupied land in the Whitehall area. One would have thought that on such a Committee a practical architect and a competent surveyor might beneficially have been included, capable of estimating the capacity of buildings commandeered and their value, and also the cost of the structures which are being plumped down on the few stretches of green turf left in our midst. We shall be surprised if, when Parliament meets next week, some early questions are not asked about this matter. In one instance at least the building appropriated has been very scantily occupied—unless, of course, more "funk-holes" are wanted as refuges for the men it seems impossible to "comb out."

Lady Drogheda has been mainly responsible for the organisation of the interesting exhibition illustrative of the development of aeronautics at the Grosvenor Gallery. Mainly pictorial, the exhibition includes an intact specimen of the Fokker aeroplane and a number of Zeppelin relics. The pictures go surprisingly far back. They show that the possibilty of flying machines had occurred to the fertile mind of Leonardo da Vinci, who made sketches and plans. Another revelation is that while the difficulty of propulsion remained unsolved until the arrival of the petrol engine, our forefathers anticipated with fair accuracy the general design of the airship so long ago as 1834, and of the aeroplane in 1843. The first airship, the Eagle, exhibited at Kensington in 1834, was 160 feet long, and was to carry twenty-five persons to Paris in six hours. In appearance it is an embryonic Zeppelin, but as it depended solely on a favouring breeze, it never fulfilled the ambitions of its inventors. The aeroplane of 1843, which was to have been driven by steam, is not greatly dissimilar to the monoplane of these days. It is believed to have come to grief on its first trip. Pictorial evidence is given of the military use of balloons in the Battle of Fleurus in 1794, and to judge from a French print, Napoleon, among his many schemes for the invasion of England, contemplated a simultaneous raid by balloons, by ships, and by a Channel tunnel. There is a good show of prints of the late eighteenth and early nineteenth century. From that date the record is both complete and continuous, down to the vivid contemporary drawings and photographs of present day aerial warfare, its methods and its effects.

The Registration of Business Names Act, 1916, is one of the first-fruits of the war. After being proposed for many years, in vain, it has now got through suddenly as part of our trade awakening. Though dated December 22, 1916, it begins working on February 22, 1917, and must be complied with by March 22. It requires the registration of the true names of all persons or partners and companies carrying on business under other surnames. As "business" includes "profession" it covers the many cases of solicitors, surveyors, doctors, etc., who practise under old firm styles. It does not touch those who are using their true surnames in their business, but it brings in all others for the whole United Kingdom. The particulars for registration are both full and precise, including details of former names and also of nationality, original and acquired. There are fines and other penalties for omission or neglect to register properly old or new business names or any changes. One clause forbids the use of the word "British" in a business name where used by persons of other nationalities so as to be misleading. There will be an Index of the Registration, and all statements filed will be open to public inspection for a shilling fee, with a further charge for copies required. Beyond all this publicity the Act provides that in every case where registration is to be made the person or firm shall "in all trade catalogues, trade circulars, show-cards, and business letters" used within the British Empire give the full true names and nationality, etc., as registered, under a fine up to £5. The fee for registration will be 5s., by postage stamp, and special offices will be opened in London, Edinburgh, and Dublin. Rules and forms will shortly be issued by the Board of Trade. So, at long last, we shall bring our law as to business names into harmony with that of all other commercial countries, and do something towards defeating the projected peaceful penetration of this country by Germany, begun before, but to be continued after, the war.

We regret to notice Mr. Hodge's announcement that he means to create some 800 new Labour Exchanges, and not even his undertaking to have no "wooden images" in them reassures us. These institutions have failed to gain the confidence of those for whom they were intended. They may have proved useful in industries where there is much casual labour of an unskilled type, but skilled workmen regard them with distrust. So much has this been the case that an influential joint committee of employers and workmen has been formed for the purpose of solving the labour problems on demobilisation with the minimum of State intervention, which has gained the adhesion of many large employers and of the leaders of the principal trade unions, who believe that they can replace most of the men returning from the war without the intervention of the Labour Exchanges. Possibly Mr. Hodge believes that he can make the offices more effective, but the prospect of adding some thousands more permanently to the number of State servants is not one to be accepted lightly if it can be avoided.

An interesting find of old monumental brasses, says the *Canterbury Diocesan Gazette*, has been made in the north transept of Barham Church. The transept, which is said by Hasted to be St. Giles' Chapel, belongs to Barham Court, and when the rest of the church was restored some years ago the then owner of the Court refused to allow any alteration to be made in it. The Court has now passed by purchase, and the present owner allowed the organ to be moved into this transept. As there were traditions of ancient brasses

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being in the church, the sites of which were no longer known, advantage was taken of the opportunity afforded by the moving of the organ to overhaul thoroughly the flooring of the transept. Under the wood of the flooring the brasses were found. One is the remains of a large figure of a civilian somewhat damaged, but of early date, 1375, and of extreme interest. No figure of the same date and style is remaining in Kent, and it is a notable addition to the fine series in the county. The other brass consists of a man in armour and his widow, and both effigies are in good preservation. The widow's effigy is very like the fine figure of Agnes Molyngton, 1454, still remaining at Dartford. The inscriptions and shields of arms are missing, but part of the crest remains, consisting of expanded dragon's wings. This is expressly noted as the crest of Digges. It is thus almost certain that one, and possibly both, the brasses are for members of the Digges' family, who began buying property in the neighbourhood as early as the reign of Henry III.

Not a little of the nonsense talked and written about the amount of land in London available for cultivation is exposed by the report of a London County Council Committee. The area has been stated as high as 14,000 acres. This estimate, it appears, was made in 1898, and much of the land has since been built upon. In reply to the allegation that the County Council have vetoed practically all schemes for cultivation, it is pointed out that the Vacant Land Cultivation Society has only applied in the whole of London for about 350 acres, excluding Hackney Marsh. When this figure is analysed, it is found that 50 acres of unoccupied land included in respect of plots on the Dulwich College estate do not exist, nearly 190 acres are situated in boroughs where other arrangements for cultivation have been made, the owners of 29 acres have arranged for the cultivation themselves, and 12 acres do not come within the Order. In addition, undefined areas of land outside the county are included, so that, after allowing for 21½ acres which a society has already been licensed by the Council to cultivate, there can be little suitable land left in the county in respect of which arrangements for cultivation have not yet been made.

Bonusless householders, who find the cost of living on a limited income a problem difficult to solve, have discovered amusement, if not consolation, in the notice issued by an insurance authority advising an enlargement of the war risks covered because of the enhanced value of furniture. The furniture might sell at an increased price, but where can the money be found for the extra insurance, or in many cases for any insurance at all? What, again, is the difference between damage to property by such explosions as that in East London and that caused by Zeppelin raids that the State should cover the former, but compel us to insure ourselves against the latter?

It is pleasant to us to know, and to be able to say so without egotism, that nearly all the congratulations that have reached us on the production of our "New Year's Number" of January 10 specially compliment us on our reproduction of the illustrations of the interiors decorated with Matone, which Messrs. Lewis Berger and Sons have produced, and which is finding such favour with architects, builders, and decorators. We can only say we should be glad always to have such facilities for good work as were entrusted to us by Messrs. Lewis Berger and Sons, and advise all who want to know more to send to them at Homerton, N.E., for a copy of their last issue of "Good Business News." The little story it contains, entitled "Three Men in a Boat," or the tale of a business trip to America by a Berger trio, is as instructive as it is amusing, and there are besides several valuable bits of information which will benefit all. Not the least timely is:—

"MR. BERGER'S" ADVICE TO INVESTORS.

Property owners! on you falls the onus
Interior walls to keep nicely maintained.
Let all the wall owners
Become good War Loaners
And buy Matoned walls with the five per cent. gained.

THE UNITY OF THE EMPIRE.

In an interview last week with Mr. Keith Murdoch, of the Australian United Cable Service, Mr. Lloyd George is reported to have said:—"The war policy of the Empire will be clearly defined. And of great importance is what I may call the preparation for peace. This will involve not only demobilisation but such other after-the-war questions *as the migration of our own people to other parts of the Empire*, the settlement of soldiers on the land, commerce, and industry after the war." On the heels of that utterance there came a Reuter telegram to the effect that Mr. Hughes, the Federal Premier, had refused the request of 400 unemployed carpenters to enable them to proceed to England to look for work. What price that for the unity of the Empire in regard to the biggest of all problems before us when the war is over? Those carpenters, or most of them, were in all probability thrown out of work by the disastrous Australian coal strike, which we have but good reason to know prostrated all industry for a month. "I am seriously contemplating selling up my business," writes a reliable correspondent of ours, an employer in his own trade, akin to ours, and a scrupulous observer of trade union obligations, "and going back to South Africa, where, at any rate, these wanton strikes would not be allowed, which are paralysing the country." Will he be given his passport if he carries out his intention? If the 400 Australian carpenters had landed here and sought work, would the British unions have struck in protest? Probably, especially if British employers had paid them higher wages. Yet the Australian troops are paid considerably higher wages than the British soldier, who is grousing about it, but has not struck yet. With all our genuine and well-deserved admiration for the Australians we shall not wound any susceptibilities by affirming that they have not more loyally served the Empire than the men of the Motherland.

Incidentally the matter opens up, as Mr. Lloyd George is reported to have said, many other after-the-war questions. If, indeed, the Dominions have made us really feel that we are all one people—if there and here the toxic atmosphere of distrust between labour and the employer is to be changed into one of mutual desire to cherish and cultivate the better relations between class and class and man and man, which the generous instincts common to the race have developed during the war, then there is indeed hope for the future. But if it is only a truce which employers or workmen may end at any moment, or if the politicians of any party are going to play into the hands of one side or the other in order to retain or buy its support of measures proposed simply for party purposes, or to delay changes which the nation as a whole demands but is little likely to get, then we must bid farewell to all hopes of real unity, and may well dread the revival with intense bitterness of industrial strife which will be fanned to fever-heat by the demagogues of all parties.

In our own trades it is a matter of common knowledge that a national strike would in all probability have supervened on that strike in London which lasted during the first half of 1913 had war not diverted the attention of all concerned. The one thing that could have ended the quarrel satisfactorily then is the only thing that can prevent its renewal presently, and that, as Mr. Neville Chamberlain phrased it at Birmingham last Saturday week, is "a true alliance of capital and labour." That we shall never get if we have not learnt during the war how marvellously production can be increased by disregarding all talk about limiting output on the one side, and by the recognition on the other that with proper organisation and really up-to-date methods and machinery it is the cheapest and best policy to pay good wages to the efficient man.

If the trade unions make this impossible by insisting on equality of payment, production will be limited and employment will diminish. To-day the needs of the nation are many, and it is being compelled to pay many unskilled workmen wages out of all proportion to their worth. It cannot afford to do that in ordinary times, and if the attempt is made to keep up the inflated wages that are being paid at the munition factories we may as well give up the industrial battle with the foreigner.

Lastly, it is imperative that employers and the employed alike should recognise that the bigger profits and better wages of the last sixty or seventy years have not been due to harder work, but to the development of labour-saving machinery, and the consequent saving of time and human labour. There are many indications that science is likely to help along another Industrial Revolution by the utilisation of fresh means of obtaining power, which may not favour the aggregation of labour in huge and overcrowded centres. Let us all see to it that this is not forgotten by either side, but that every possible effort is made to improve our opportunities.

Mr. C. Streets, for sixteen years deputy sanitary inspector to the Lincoln Corporation, has been appointed sanitary inspector to the Worcester Corporation.

Richard Grose, Gravesend builder, attributed his failure last Wednesday to the fact that he had supplied the Government with material at 50 per cent. under cost.

"A few days ago," so Lord Knutsford told the shareholders of Barclays Bank, "I was trying to explain the word 'moratorium' to a friend, who turned to me and said, 'Why, isn't there a good one at Golder's Green?'"

Mr. Frederic William Manuelle, head of A. and F. Manuelle, granite merchants, Bishopsgate Street, E.C., and of Aberdeen, Guernsey, and Norway, left £100 each to Charing Cross Hospital, a hospital in Aberdeen, and a hospital in Guernsey. His will was proved at £79,389.

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THE SENEFELDER CLUB.

The Senefelder Club, whose co-operation at Burlington House has lent very much of the interest attaching to the winter exhibition this year of the Royal Academy, has a very good show of its own at the Leicester Galleries, including lithographs by its own members, and some good examples of the best-known works of French artists of the last century.

There are also some lithographs which were specially exhibited some twenty years since, made by Alfred Gilbert, G. F. Watts, Lord Leighton, and others, including some heads, a study, and two landscapes.

Among the lithographs by the club members, Mr. A. S. Hartrick's "Niedpath Castle, Tweed" (95), is one of the best; and "Dandelions" (103), by Miss Lily Blatherwick, is fully up to her usual efforts. There is also a very effective night scene (118) by Mr. Daniel A. Veresmith. Among the works by the French artists and their contemporaries are some fine drawings by Corot, E. Carrière, Toulouse-Lautrec, E. Manet, Felicien Rops, Fantin-Latour, M. Strinlen, M. Lepere, and others.

In the next room is a collection of pictures and drawings by M. Léon de Smet, the Belgian artist. We liked his flower-pieces best. One or two decorative subjects are of interest, such as the "Girl and Parrot" (10) and the "Russian Ballet."

THE PROPERTY OWNERS' ASSOCIATION.

The fifteenth annual meeting of the Property Owners' Association was held at the Cannon Street Hotel on Thursday evening.

Mr. Geo. Billings proposed the re-election of Mr. Edwin Evans as President, Mr. G. A. Gale seconded, and the motion was carried.

The fifteenth annual report stated that in the year 1916 over three hundred new members had been added to the roll. The Council had appointed local agents in numerous districts, and had dealt with two thousand inquiries.

On the motion of Mr. W. M. Bradbear, seconded by Mr. J. G. Wright, the following retiring Vice-Presidents were re-elected:—Messrs. James Boyton, M.P., Harold Griffin, Arthur Grover, A. B. Coulsell, Alfred Moore, W. F. Nokes, W. A. Raikes, and H. Marsden Miller.

Mr. H. Coates proposed, and Mr. W. Lee seconded, that Messrs. Ben Andrews, W. Foxton, Wm. Hammond, J.P., J. H. T. Keeves, A. J. H. Prevost, J. C. Platt, E. H. Wright, J. Edmondson, and Montagu Evans be elected members of the Council, and the vote was carried. Among the new members of the Council elected were Messrs. H. Coates, Alex. Robertson, R. J. Lang (Woolwich), and Alderman C. Pinkham (Willesden). On the motion of Mr. B. G. Evans, seconded by Mr. R. J. Lester, the auditors were re-elected.

At the public meeting which followed, in his Presidential address, Mr. Edwin Evans ventured to say that the time was coming when there would be, and indeed was now, a great eagerness to promote the building of small houses for the people. Speaking upon the War Rent Restrictions Act, he said he desired to enter a solemn protest against the action of borough councils who had chosen such times as these to reduce or abolish compounding allowances. In reference to the warning issued by the new President of the Local Government Board, Mr. Evans said the Association were the first to take up the position against raising rents and to direct into reasonable channels the provisions of that Bill. So far as they were concerned, they had clean hands. Much of the trouble in London had arisen through the action of some of the borough councils, who, during the time of war, when landlords were restricted and making great sacrifices, had interfered with compounding allowances given for work which the councils could not do themselves. He only complained as to this action being taken during war-time. He was not sure that compounding was good at all, but he asked the councils to act fairly and adopt a regular system. Mr. Evans next commented upon dilapidations notices being served during war-time, where the length of lease had nine hundred years to run, and considered action of that kind must be deplored. He was glad to tell them that, on behalf of several of their members, the Association had found reasonable means of coming to terms to secure postponement of these notices until six months after the declaration of peace. He believed the Association would be more required than ever during the anxious period now coming. In one quarter a tax on property of 6d. in the pound on the capital value, representing 5s. in the pound on the rental, was advocated, and nothing short of a great association was needed to warn off these Socialistic kind of people.

Mr. Harold Griffin gave an interesting address on the progress of the Association, and said they had credit for having pursued an enlightened and common-sense policy. What must the little tin gods in the boroughs think of themselves now, after years of harrying the poor by paving over their gardens and preventing them from having a rabbit to amuse the children? The Government proclamation to grow potatoes on every available inch of land and to keep as many fowls and rabbits as each individual could find room for outside his back door, or perhaps even on the first-floor landing, must have sounded to them like the crack of doom.

An address in support of "Property Owners' Defence" and of the necessity of property owners combining was given by Mr. M. Cheverton-Brown (President of the National Federation of Property Owners and Ratepayers).

Mr. A. W. Shelton (President of the Nottingham Property Owners' Association) said there was a shortage at present of half-a-million working-class houses, and that shortage was increasing at the rate of 200 per day, chiefly due to Part I. of that Act.

The meeting unanimously voted against Part I. of the Act.

CONCRETE AND REINFORCED CONCRETE.

CHAPTER III.—(*Continued from page 89.*)

(*b*) *Coarse Aggregate* should consist of gravel or crushed stone which is retained on a screen having ¼-in. diameter holes, and should be graded from the smallest to the largest particles; it should be clean, hard, durable, and free from all deleterious matter. Aggregates containing dust and soft, flat, or elongated particles should be excluded. The committee does not feel warranted in recommending the use of blast-furnace slag as an aggregate, in the absence of adequate data as to its value, especially in reinforced concrete construction. No satisfactory specifications or methods of inspection have been developed that will control its uniformity and ensure the durability of the concrete in which it is used.

The aggregate must be small enough to produce with the mortar a homogeneous concrete of sluggish consistency which will pass readily between and easily surround the reinforcement and fill all parts of the forms. The maximum size of particles is variously determined for different types of construction from that which will pass a ½-in. ring to that which will pass a 1½-in. ring.

For concrete in large masses the size of the coarse aggregate may be increased, as a large aggregate produces a stronger concrete than a fine one; however, it should be noted that the danger of separation from the mortar becomes greater as the size of the coarse aggregate increases.

Cinder concrete should not be used for reinforced concrete structures, except in floor-slabs not exceeding 8 ft. span. It also may be used for fire protection purposes where not required to carry loads. The cinders used should be composed of hard, clean, vitreous clinker, free from sulphides, unburned coal, or ashes.

3. WATER.

The water used in mixing concrete should be free from oil, acid, alkali, or organic matter.

4. METAL REINFORCEMENT.

The Committee recommends as a suitable material for reinforcement, steel of structural grade filling the requirements of the specifications for billet steel concrete reinforcement bars of the American Society for Testing Materials.

For reinforcing slabs, small beams, or minor details, or for reinforcing for shrinkage and temperature stresses, steel wire, expanded metal, or other reticulated steel may be used, with the unit stresses hereinafter recommended.

The reinforcement should be free from flaking, rust, scale, or coatings of any character which would tend to reduce or destroy the bond.

CHAPTER IV.

MIXING AND PLACING.

1. PROPORTIONS.

The materials should be carefully selected, of uniform quality, and proportioned with a view to securing as nearly as possible a maximum density, which is obtained by grading the aggregates so that the smaller particles fill the spaces between the larger, thus reducing the voids in the aggregate to the minimum.

(*a*) *Unit of Measure.*—The measurement of the fine and coarse aggregates should be by loose volume. The unit of measure should be a bag of cement, containing 94 lbs. net, which should be considered the equivalent of 1 cubic foot.

(*b*) *Relation of Fine and Coarse Aggregates.*—The fine and coarse aggregates should be used in such proportions as will secure maximum density. These proportions should be carefully determined by density experiments, and the grading of the fine and coarse aggregates should be uniformly maintained, or the proportions changed, to meet the varying sizes.

(*c*) *Relation of Cement and Aggregates.*—For reinforced concrete construction, one part of cement to a total of six parts of fine and coarse aggregates measured separately should generally be used. For columns, richer mixtures are preferable. In massive masonry or rubble concrete a mixture of 1:9 or even 1:12 may be used.

These proportions should be determined by the strength or other qualities required in the construction at the critical period of use. Experience and judgment based on observation and tests of similar conditions in similar localities are excellent guides as to the proper proportions for any particular case.

In important construction advance tests should be made on concrete composed of the materials to be used in the work. These tests should be made by standardised methods to obtain uniformity in mixing, proportioning, and storage, and in case the results do not conform to the requirements of the work, aggregates of a better quality or more cement should be used to obtain the desired quality of concrete.

2. MIXING.

The mixing of concrete should be thorough, and continue until the mass is uniform in colour and homogeneous. As the maximum density and greatest strength of a given mixture depend largely on thorough and complete mixing, it is essential that this part of the work should receive special attention and care.

Inasmuch as it is difficult to determine, by visual inspection, whether the concrete is uniformly mixed, especially where aggregates having the colour of cement are used, it is essential that the mixing should occupy a definite period of time. The minimum time will depend on whether the mixing is done by machine or hand.

(*a*) *Measuring Ingredients.*—Methods of measurement of the various ingredients should be used which will secure at all times separate and uniform measurement of cement, fine aggregate, coarse aggregate, and water.

(*b*) *Machine Mixing.*—The mixing should be done in a batch machine mixer of a type which will ensure the uniform distribution of

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the materials throughout the mass, and should continue for the minimum time of 1½ min. after all the ingredients are assembled in the mixer. For mixers of two or more cubic yards capacity the minimum time of mixing should be 2 mins. Since the strength of the concrete is dependent upon thorough mixing, a longer time than this minimum is preferable. It is desirable to have the mixer equipped with an attachment for automatically locking the discharging device so as to prevent the emptying of the mixer until all the materials have been mixed together for the minimum time required after they are assembled in the mixer. Means should be provided to prevent aggregates being added after the mixing has commenced. The mixer should also be equipped with water storage, and an automatic measuring device which can be locked is desirable. It is also desirable to equip the mixer with a device recording the revolutions of the drum. The number of revolutions should be so regulated as to give at the periphery of the drum a uniform speed; about 200 ft. per minute seems to be the best speed in the present state of the art.

(*c*) *Hand Mixing.*—Hand mixing should be done on a water-tight platform, and especial precautions taken after the water has been added to turn all the ingredients together at least six times, and until the mass is homogeneous in appearance and colour.

(*d*) *Consistency.*—The materials should be mixed wet enough to produce a concrete of such a consistency as will flow sluggishly into the forms and about the metal reinforcement when used, and which, at the same time, can be conveyed from the mixer to the forms without separation of the coarse aggregate from the mortar. The quantity of water is of the greatest importance in securing concrete of maximum strength and density; too much water is as objectionable as too little.

(*e*) *Retempering.*—The remixing of mortar or concrete that has partly set should not be permitted.

3. PLACING CONCRETE.

(*a*) *Methods.*—Concrete after the completion of the mixing should be conveyed rapidly to the place of final deposit; under no circumstances should concrete be used that has partly set.

Concrete should be deposited in such a manner as will permit the most thorough compacting, such as can be obtained by working with a straight shovel or slicing tool kept moving up and down until all the ingredients are in their proper place. Special care should be exercised to prevent the formation of laitance; where laitance has formed it should be removed, since it lacks strength and prevents a proper bond in the concrete.

Before depositing concrete, the reinforcement should be carefully placed in accordance with the plans. It is essential that adequate means be provided to hold it in its proper position until the concrete has been deposited and compacted; care should be taken that the forms are substantial and thoroughly wetted (except in freezing weather) or oiled, and that the space to be occupied by the concrete is free from débris. When the placing of concrete is suspended, all necessary grooves for joining future work should be made before the concrete has set.

When work is resumed, concrete previously placed should be roughened, cleansed of foreign material and laitance, thoroughly wetted, and then slushed with a mortar consisting of one part Portland cement and not more than two parts fine aggregate.

The surfaces of concrete exposed to premature drying should be kept covered and wet for a period of at least seven days.

Where concrete is conveyed by spouting, the plant should be of such a size and design as to ensure a practically continuous stream in the spout. The angle of the spout with the horizontal should be such as to allow the concrete to flow without a separation of the ingredients; in general an angle of about 27 deg. or one vertical to two horizontal is good practice. The spout should be thoroughly flushed with water before and after each run. The delivery from the spout should be as close as possible to the point of deposit. Where the discharge must be intermittent, a hopper should be provided at the bottom. Spouting through a vertical pipe is satisfactory when the flow is continuous; when it is unchecked and discontinuous it is highly objectionable, unless the flow is checked by baffle plates.

(*b*) *Freezing Weather.*—Concrete should not be mixed or deposited at a freezing temperature, unless special precautions are taken to prevent the use of materials covered with ice crystals or containing frost, and to prevent the concrete from freezing before it has set and sufficiently hardened.

As the coarse aggregate forms the greater portion of the concrete, it is particularly important that this material be warmed to well above the freezing point.

The enclosing of a structure and the warming of the space inside the enclosure is recommended, but the use of salt to lower the freezing point is not recommended.

(*c*) *Rubble Concrete.*—Where the concrete is to be deposited in massive work, its value may be improved and its cost materially reduced by the use of clean stones, saturated with water, thoroughly embedded in and entirely surrounded by concrete.

(*d*) *Under Water.*—In placing concrete under water, it is essential to maintain still water at the place of deposit. With careful inspection, the use of tremies, properly designed and operated, is a satisfactory method of placing concrete through water. The concrete should be mixed very wet (more so than is ordinarily permissible) so that it will flow readily through the tremie and into place with practically a level surface.

The coarse aggregate should be smaller than ordinarily used, and never more than 1 in. in diameter. The use of gravel facilitates mixing and assists the flow. The mouth of the tremie should be buried in the concrete so that it is at all times entirely sealed and the surrounding water prevented from forcing itself into the tremie; the concrete will then discharge without coming in contact with the water. The tremie should be suspended so that it can be lowered quickly when it is necessary either to choke off or prevent too rapid flow; the lateral flow preferably should be not over 15 ft.

The flow should be continuous in order to produce a monolithic mass and to prevent the formation of laitance in the interior.

In case the flow is interrupted, it is important that all laitance be removed before proceeding with the work.

In large structures it may be necessary to divide the mass of concrete into several small compartments or units, to permit the continuous filling of each one. With proper care it is possible in this manner to obtain as good results under water as in the air.

A less desirable method is the use of the drop-bottom bucket. Where this method is used, the bottom of the bucket should be released when in contact with the surface of the place of deposit.

CHAPTER V.

FORMS.

Forms should be substantial and unyielding, in order that the concrete may conform to the design and be sufficiently tight to prevent the leakage of mortar.

It is vitally important to allow sufficient time for the proper hardening of the concrete, which should be determined by careful inspection before the forms are removed.

Many conditions affect the hardening of concrete, and the proper time for the removal of the forms should be determined by some competent and responsible person.

It may be stated in a general way that forms should remain in place longer for reinforced concrete than is required for plain or massive concrete, and longer for horizontal than is required for vertical members.

In general, it may be considered that concrete has hardened sufficiently when it has a distinctive ring under the blow of a hammer, but this test is not reliable if there is a possibility that the concrete is frozen.

CHAPTER VI.

DETAILS OF CONSTRUCTION.

1. JOINTS.

(*a*) *In Concrete.*—It is desirable to cast an entire structure at one operation, but as this is not always possible, especially in large structures, it is necessary to stop the work at some convenient point. This should be selected so that the resulting joint may have the least possible effect on the strength of the structure. It is therefore recommended that the joint in columns be made flush with the lower side of the girders, or in flat slab construction at the bottom of the flare of the column head; that the joints in girders be at a point midway between supports, unless a beam intersects a girder at this point, in which case the joint should be offset a distance equal to twice the width of the beam; and that the joints in the members of a floor system should in general be made at or near the centre of the span.

Joints in columns should be perpendicular to the axis, and in girders, beams, and floor-slabs perpendicular to the plane of their surfaces. When it is necessary to provide for shear at right angles to the axis, it is permissible to incline the plane of the joint as much as 30° from the perpendicular. Joints in arch rings should be on planes as nearly radial as practicable.

Before placing the concrete on top of a freshly poured column a period of at least 2 hours should be allowed for the settlement and shrinkage.

Shrinkage and contraction joints may be necessary to concentrate cracks due to temperature in smooth even lines. The number of these joints, which should be determined and provided for in the design, will depend on the range of temperature to which the concrete will be subjected and on the amount and position of the reinforcement. In massive work, such as retaining walls, abutments, etc., built without reinforcement, contraction joints should be provided at intervals of from 25 to 50 ft., and with reinforcement from 50 to 80 ft.; the smaller the height and thickness the closer the spacing. The joints should be tongued and grooved to maintain the alignment in case of unequal settlement. A groove may be formed in the surface as a finish to vertical joints.

Shrinkage and contraction joints should be lubricated by an application of petroleum oil or a similar material to permit a free movement when the concrete expands or contracts.

The movement of the joint due to expansion and contraction may be facilitated by the insertion of a sheet of copper, zinc, or even tarred paper.

(*b*) *In Reinforcement.*—Wherever it is necessary to splice tension reinforcement the length of lap should be determined on the basis of the safe bond stress, the stress in the bar and the shearing resistance of the concrete at the point of splice; or a connection should be made between the bars of sufficient strength to carry the stress. Splices at points of maximum stress in tension should be avoided. In columns, bars more than ¾ in. in diameter not subject to tension should have their ends properly squared and butted together in suitable sleeves; smaller bars may be lapped, as indicated for tension reinforcement. At foundations bearing plates should be provided for supporting the bars, or the bars may be carried into the footing a sufficient distance to transmit the stress in the steel to the concrete by means of the bearing and the bond resistance. In no case should reliance be placed upon the end bearing of bars on concrete.

2. SHRINKAGE AND TEMPERATURE CHANGES.

The stresses resulting from shrinkage due to hardening and contraction from temperature changes are important in monolithic construction, and unless cared for in the design will produce objectionable cracks; cracks cannot be entirely prevented, but the effects can be minimised.

Large cracks, produced by quick hardening or wide ranges of temperature, can be broken up to some extent into small cracks by placing reinforcement in the concrete; in long, continuous lengths of concrete, it is better to provide shrinkage joints at points in the structure where they will do little or no harm. Reinforcement is of assistance, and permits longer distance between shrinkage joints than when no reinforcement is used.

Provision for shrinkage should be made when small or thin masses are joined to larger

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or thicker masses; at such places the use of fillets, similar to those used in metal castings, but proportionately larger, is recommended.

Shrinkage cracks are likely to occur at points where fresh concrete is joined to that which is set, and hence in placing the concrete, construction joints should be made, as described in Chapter VI., Section 1, or, if possible, at points where joints would naturally occur in dimension-stone masonry.

3. FIRE-PROOFING.

Concrete, because incombustible and of a low rate of heat conductivity, is highly efficient and admirably adapted for fire-proofing purposes. This has been demonstrated by experience and tests.

The dehydration of concrete probably begins at about 500° Fahr. and is completed at about 900° Fahr., but experience indicates that the volatilisation of the water absorbs heat from the surrounding mass, which, together with the resistance of the air cells, tends to increase the heat resistance of the concrete, so that the process of dehydration is very much retarded. The concrete that is actually affected by fire and remains in position affords protection to that beneath it.

The thickness of the protective coating should be governed by the intensity and duration of a possible fire and the rate of heat conductivity of the concrete. The question of the rate of heat conductivity of concrete is one which requires further study and investigation before a definite rate for different classes of concrete can be fully established. However, for ordinary conditions, it is recommended that the metal be protected by a minimum of 2 in. of concrete on girders and columns, 1½ in. on beams, and 1 in. on floor-slabs.

Where fire-proofing is required, and not otherwise provided in monolithic concrete columns, it is recommended that the concrete to a depth of 1½ in. be considered as protective covering, and not included in the effective section.

The corners of columns, girders, and beams should be bevelled or rounded, as a sharp corner is more seriously affected by fire than a round one; experience shows that round columns are more fire-resistive than square.

4. WATER-PROOFING.

Many expedients have been resorted to for rendering concrete impervious to water. Experience shows, however, that when mortar or concrete is proportioned to obtain the gretest practicable density and is mixed to the proper consistency (Chapter IV., Section 2 *d*), the resulting mortar or concrete is impervious under moderate pressure.

On the other hand, concrete of dry consistency is more or less pervious to water, and, though compounds of various kinds have been mixed with the concrete or applied as a wash to the surfaoce, in an effort to offset this defect, these expedients have generally been disappointing, for the reason that many of these compounds have at best but temporary value, and in time lose their power of imparting impermeability to the concrete.

In the case of subways, long retaining walls and reservoirs, provided the concrete itself is impervious, cracks may be so reduced, by horizontal and vertical reinforcement properly proportioned and located, that they will be too minute to permit leakage, or will be closed by infiltration of silt.

Asphaltic or coal-tar preparations applied either as a mastic or as a coating on felt or cloth fabric, are used for water-proofing, and should be proof against injury by liquids or gases.

For retaining and similar walls in direct contact with the earth, the application of one or two coatings of hot coal-tar pitch, following a painting with a thin wash of coal tar dissolved in benzol, to the thoroughly dried surface of concrete is an efficient method of preventing the penetration of moisture from the earth.

5. SURFACE FINISH.

Concrete is a material of an individual type, and should be used without effort at imitation of other building materials. One of the important problems connected with its use is the character of the finish of exposed surfaces. The desired finish should be determined before the concrete is placed, and the work conducted so as to facilitate securing it. The natural surface of the concrete in most structures is unobjectionable, but in others the marks of the forms and the flat, dead surface are displeasing, making some special treatment desirable. A treatment of the surface which removes the film of cement and brings the aggregates of the concrete into relief, either by scrubbing with brushes and water before it is hard, or by tooling it after it is hard, is frequently used to erase the form markings and break the monotonous appearance of the surface. Besides being more pleasing in immediate appearance, such a surface is less subject to discoloration and hair cracking than is a surface composed of the cement that segregates against the forms, or one that is made by applying a cement wash. The aggregates can also be exposed by washing with hydrochloric acid diluted with from 6 to 10 parts of water. The plastering of surfaces should be avoided, for even if carefully done, it is liable to peel off under the action of frost or temperature changes.

Various effects in texture and in colour can be obtained when the surface is to be scrubbed or tooled, by using aggregates of the desired size and colour. For a fine-grained texture a granolithic surface mixture can be made and placed against the face forms to a thickness of about 1 in. as the placing of the body of the concrete proceeds.

A smooth, even surface, without form marks, can be secured by the use of plastered forms, which, in structures having many duplications of members, can be used repeatedly; these are made in panels of expanded metal or wire mesh coated with plaster, and the joints made at edges, and closed with plaster of Paris.

CHAPTER VII.

DESIGN.

1. MASSIVE CONCRETE.

In the design of massive or plain concrete, no account should be taken of the tensile strength of the material, and sections should usually be proportioned so as to avoid tensile stresses except in slight amounts to resist indirect stresses. This will generally be accomplished in the case of rectangular shapes if the line of pressure is kept within the middle third of the section, but in very large structures, such as high masonry dams, a more exact analysis may be required. Structures of massive concrete are able to resist unbalanced lateral forces by reason of their weight; hence the element of weight rather than strength often determines the design. A leaner and relatively cheap concrete, therefore, will often be suitable for massive concrete structures.

It is desirable generally to provide joints at intervals to localise the effect of contraction. (Chapter VI., Section 1.)

Massive concrete is suitable for dams, retaining walls, and piers in which the ratio of length to least width is relatively small. Uunder ordinary conditions, this ratio should not exceed four. It is also suitable for arches of moderate span.

2. REINFORCED CONCRETE.

The use of metal reinforcement is particularly advantageous in members such as beams in which both tension and compression exist, and in columns where the principal stresses are compressive, and where there also may be cross-bending. Therefore the theory of design here presented relates mainly to the analysis of beams and columns.

3. GENERAL ASSUMPTIONS.

(*a*) *Loads.*—The forces to be resisted are those due to :—

1. *The dead load*, which includes the weight of the structure and fixed loads and forces
2. *The live load*, or the loads and forces which are variable. The dynamic effect of the live load will often require consideration. Allowance for the latter is preferably made by a proportionate increase in either the live load or the live-load stresses. The working stresses hereinafter recommended are intended to apply to the equivalent static stresses thus determined.

In the case of high buildings, the live load on columns may be reduced in accordance with the usual practice.

(*b*) *Lengths of Beams and Columns.*—The span length for beams and slabs simply supported should be taken as the distance from centre to centre of supports, but need not be taken to exceed the clear span plus the depth of beam or slab. For continuous or restrained beams built monolithically into supports, the span length may be taken as the clear distance between faces of supports. Brackets should not be considered as reducing the clear span in the sense here intended, except that when brackets which make an angle of 45 deg. or more with the axis of a restrained beam are built monolithically with the beam, the span may be measured from the section where the combined depth of beam and bracket is at least one-third more than the depth of the beam. Maximum negative moments are to be considered as existing at the end of the span as here defined.

When the depth of a restrained beam is greater at its ends than at mid-span, and the slope of the bottom of the beam at its ends makes an angle of not more than 15 deg. with the direction of the axis of the beam at mid-span, the span length may be measured from face to face of supports.

The length of columns should be taken as the maximum unstayed length.

(*c*) *Stresses.*—The following assumptions are recommended as a basis for calculations :

1. Calculations will be made with reference to working stresses and safe loads, rather than with reference to ultimate strength and ultimate loads.
2. A plane section before bending remains plane after bending.
3. The modulus of elasticity of concrete in compression is constant within the usual limits of working stresses. The distribution of compressive stress in beams is therefore rectilinear.
4. In calculating the moment of resistance of beams, the tensile stresses in the concrete are neglected.
5. The adhesion between the concrete and the reinforcement is perfect. Under compressive stress the two materials are therefore stressed in proportion to their moduli of elasticity.
6. The ratio of the modulus of elasticity of steel to the modulus of elasticity of concrete is taken at 15, except as modified in Chapter VIII., Section 8.
7. Initial stress in the reinforcement due to contraction or expansion of the concrete is neglected.

It is recognised that some of the assumptions given herein are not entirely borne out by experimental data. They are given in the interest of simplicity and uniformity, and variations from exact conditions are taken into account in the selection of formulas and working stresses.

The deflection of a beam depends upon the strength and stiffness developed throughout its length. For calculating deflection, a value of 8 for the ratio of the moduli will give results corresponding approximately with the actual conditions.

4. T-BEAMS.

In beam and slab construction an effective bond should be provided at the junction of the beam and slab. When the principal slab reinforcement is parallel to the beam, transverse reinforcement should be used, extending over the beam and well into the slab.

The slab may be considered an integral part of the beam, when adequate bond and shearing resistance between slab and web of beam is provided, but its effective width shall be determined by the following rules :

(*a*) It shall not exceed one-fourth of the span length of the beam;

(*b*) Its overhanging width on either side of the web shall not exceed six times the thickness of the slab.

In the design of continuous T-beams, due consideration should be given to the compressive stress at the support.

(*Continued on page 108.*)

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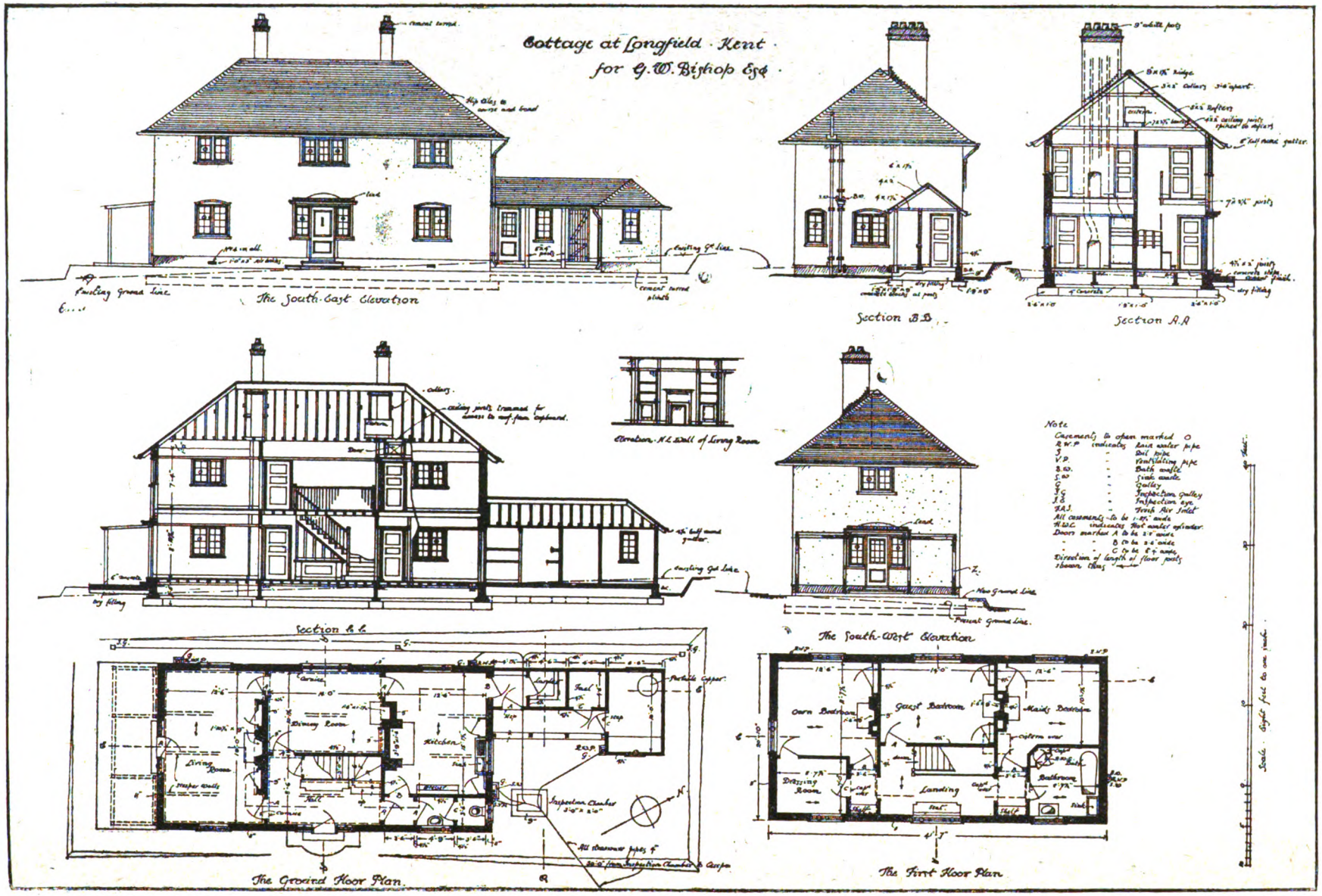
Cottage at Longfield · Kent ·
for G. W. Bishop Esq.
The South-East Elevation
Section B.B.
Section A.A
Elevation N.E. Wall of Living Room
The South-West Elevation
Section A.B.
The Ground Floor Plan.
The First Floor Plan
Note.
Casements to open marked O
R.W.P. indicates Rain water pipe
S - Soil pipe
V.P. - Ventilating Pipe
B.W. - Bath waste
S.W. - Sink waste
G - Gulley
I.G - Inspection Gulley
I.E. - Inspection eye
F.A.I. - Fresh Air Inlet
All casements to be 1.6" wide
H.W.C. indicates Hot water cylinder
Doors marked A to be 2'6" wide
" " B " " 2'4" "
" " C " " 2'0" "
Direction of length of floor joists shown thus
Scale - Eight feet to one inch.

COTTAGE AT LONGFIELD, KENT.—Mr. Sidney K. Greenslade, A.R.I.B.A., Architect.

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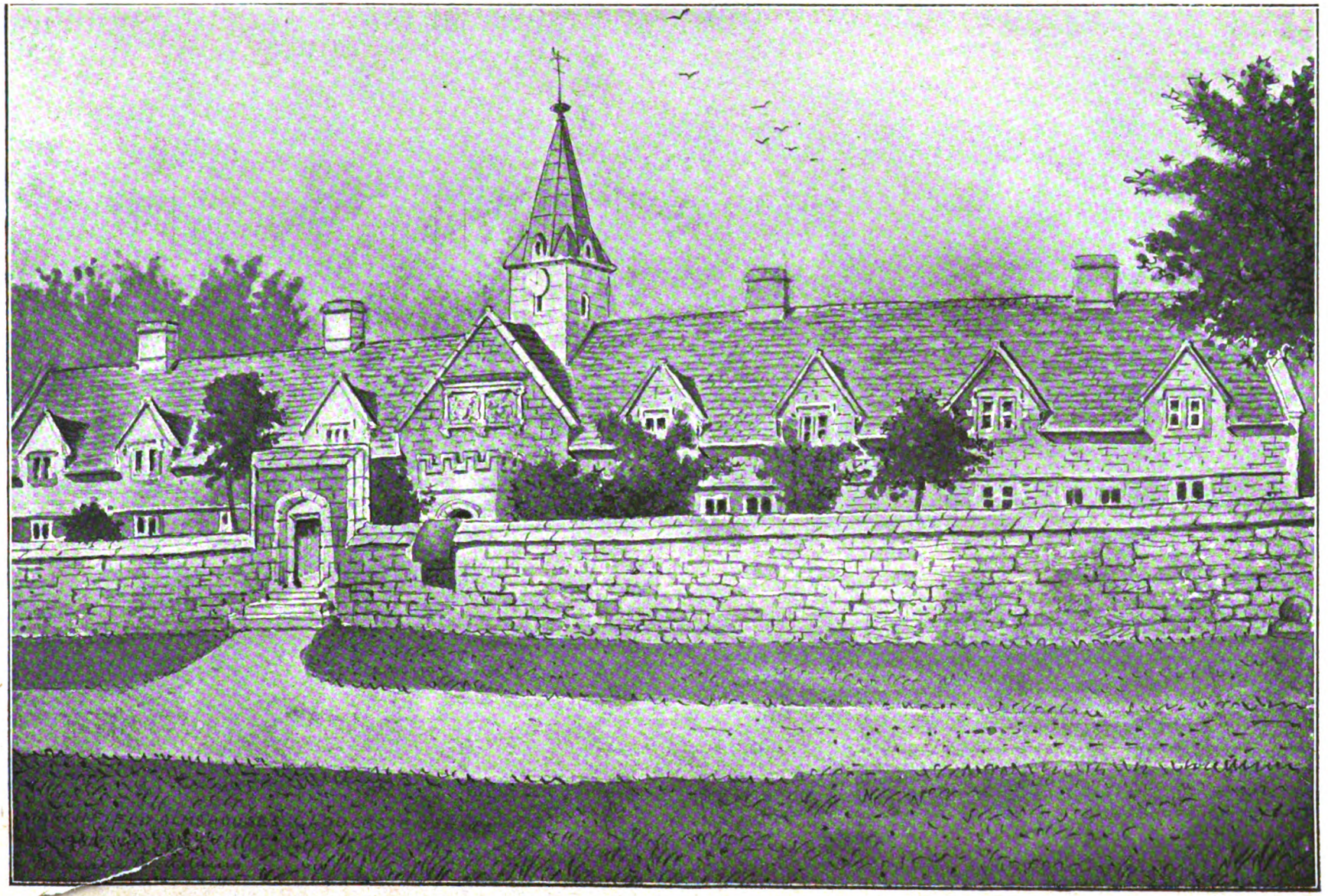

THE ROW OF ALMSHOUSES, MARSHFIELD, GLOUCESTERSHIRE.—Sketched by Mr. MAURICE B. ADAMS, F.R.I.B.A.

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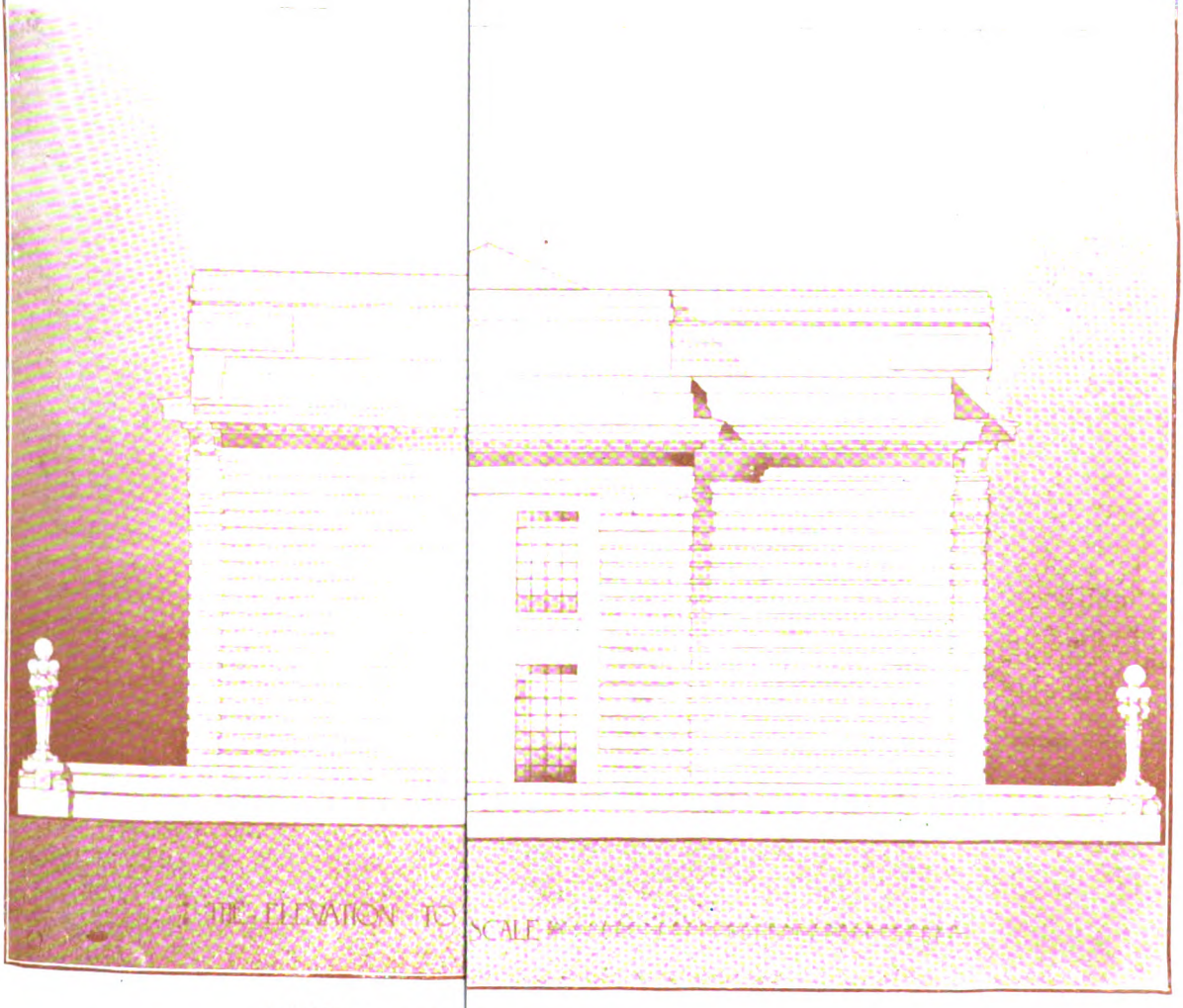
: VNIVERSITY COLLEGE & HO

Park Place Front



SIDE ELEVATION TO SCALE

UNIVERSITY [illegible] L.R.A., Architect.

DETAIL OF ARBOUR [illegible] A., and GEORGE WENYON, M.S.A., [illegible]

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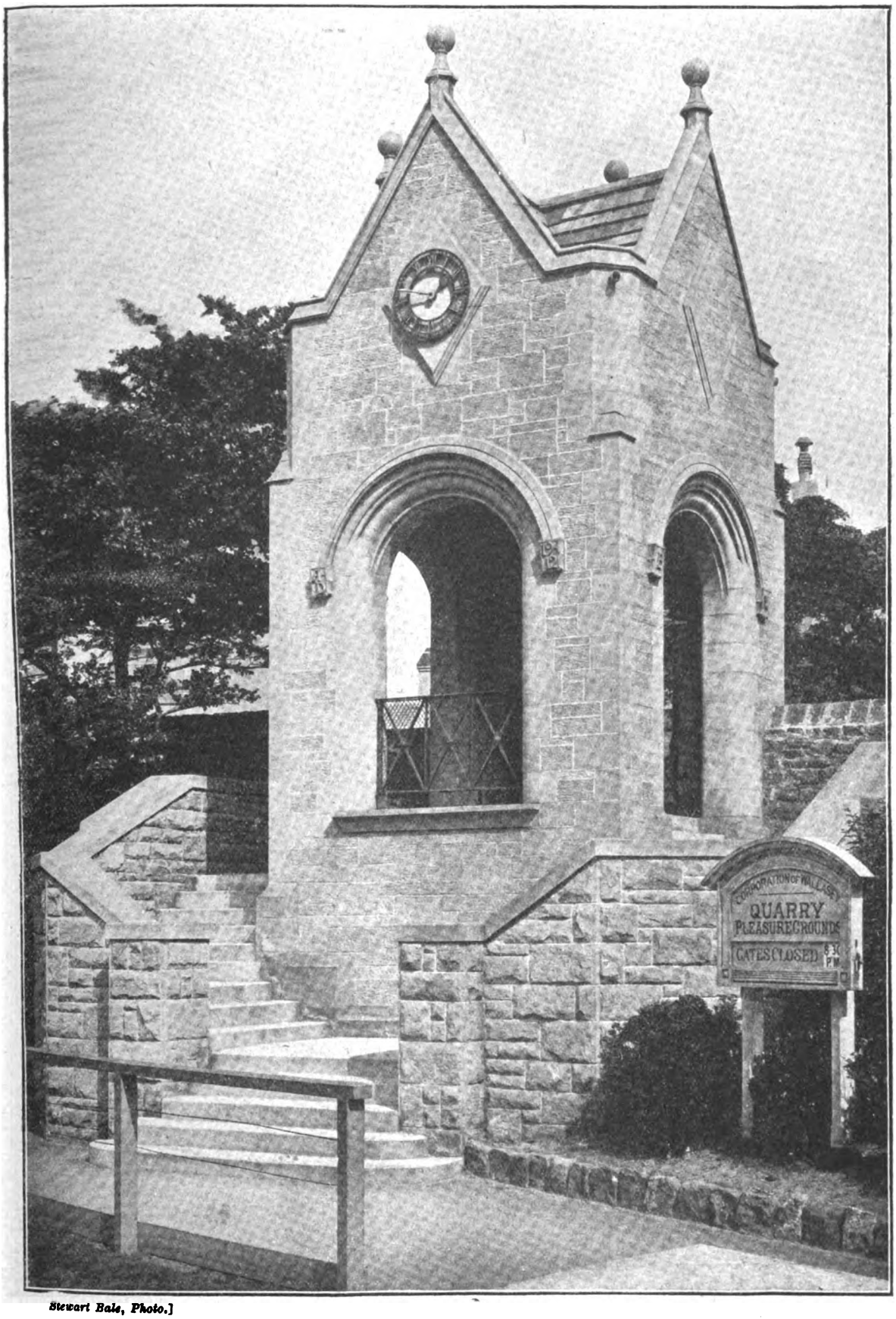

Stewart Bale, Photo.]

THE JAMES SMITH MEMORIAL, WALLASEY, CHESHIRE.

Messrs. Briggs, Wolstenholme and Thornely, FF.R.I.B.A. Architects.

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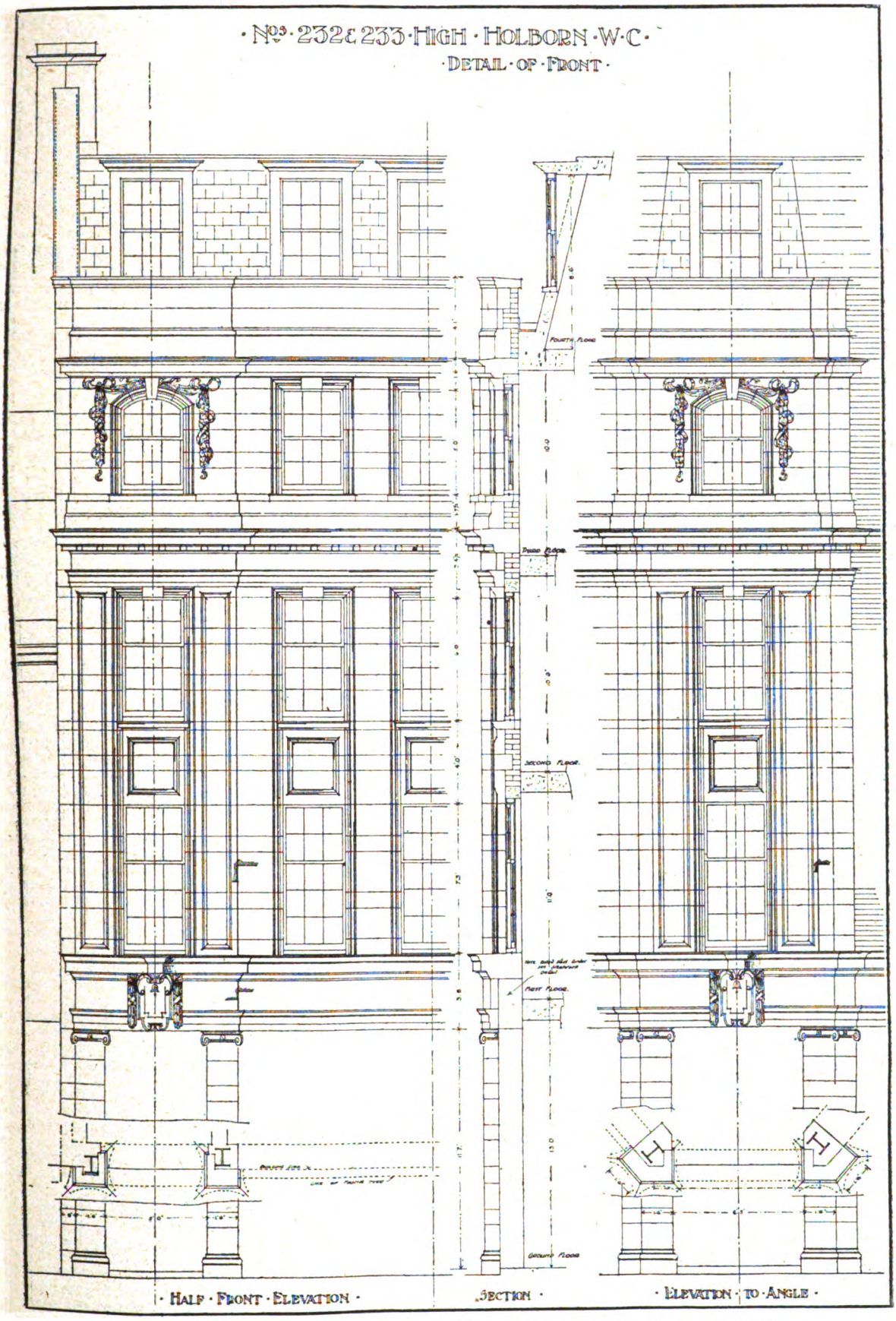

DETAIL OF NEW PREMISES, HIGH HOLBORN, W.C.

Mr. LEONARD MARTIN, F.R.I.B.A., Architect.

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CONCRETE AND REINFORCED CONCRETE.

(*Continued from page 97.*)

Beams in which the T-form is used only for the purpose of providing additional compression area of concrete should preferably have a width of flange not more than three times the width of the stem and a thickness of flange not less than one-third of the depth of the beam. Both in this form and in the beam and slab form the web stresses and the limitations in placing and spacing the longitudinal reinforcement will probably be controlling factors in design.

5. FLOOR SLABS SUPPORTED ALONG FOUR SIDES.

Floor-slabs having the supports extending along the four sides should be designed and reinforced as continuous over the supports. If the length of the slab exceeds one and one-half times its width, the entire load should be carried by transverse reinforcement.

For uniformly distributed loads on square slabs, one-half the live and dead load may be used in the calculations of moment to be resisted in each direction. For oblong slabs, the length of which is not greater than one and one-half times their width, the moment to be resisted by the transverse reinforcement may be found by using a proportion of the live and dead load equal to that given by the formula, $r = \frac{l}{b} - 0.5$, where l = length and b = breadth of slab. The longitudinal reinforcement should then be proportioned to carry the remainder of the load.

In placing reinforcement in such slabs account may well be taken of the fact that the bending moment is greater near the centre of the slab than near the edges. For this purpose two-thirds of the previously calculated moments may be assumed as carried by the centre half of the slab and one-third by the outside quarters.

Loads carried to beams by slabs which are reinforced in two directions will not be uniformly distributed to the supporting beams, and the distribution will depend on the relative stiffness of the slab and the supporting beams. The distribution which may be expected ordinarily is a variation of the load in the beam in accordance with the ordinates of a parabola, having its vertex at the middle of the span. For any given design, the probable distribution should be ascertained and the moments in the beam calculated accordingly.

6.—CONTINUOUS BEAMS AND SLABS.

When the beam or slab is continuous over its supports, reinforcement should be fully provided at points of negative moment, and the stresses in concrete recommended in Chapter VIII., Section 4, should not be exceeded. In computng the positive and negative moments in beams and slabs continuous over several supports, due to uniformly distributed loads, the following rules are recommended :—

(*a*) For floor slabs the bending moments at centre and at support should be taken at $\frac{w\ l^2}{12}$ for both dead and live loads, where w represents the load per linear unit and l the span length.

(*b*) For beams the bending moment at centre and at support for interior spans should be taken at $\frac{w\ l^2}{10}$, and for end spans it should be taken at $\frac{w\ l^2}{12}$ for centre and interior support for both dead and live loads.

(*c*) In the case of beams and slabs continuous for two spans only, with their ends restrained, the bending moment both at the central support and near the middle of the span should be taken as $\frac{w\ l^2}{10}$.

(*d*) At the ends of continuous beams the amount of negative moment which will be developed in the beam will depend on the condition of restraint or fixedness, and this will depend on the form of construction used. In the ordinary cases a moment of $\frac{w\ l^2}{16}$ may be taken; for small beams running into heavy columns this should be increased, but not to exceed $\frac{w\ l^2}{12}$.

For spans of unusual length, or for spans of materially unequal length, more exact calculations should be made. Special consideration is also required in the case of concentrated loads.

Even if the centre of the span is designed for a greater bending moment than is called for by (*a*) or (*b*), the negative moment at the support should not be taken as less than the values there given.

Where beams are reinforced on the compression side, the steel may be assumed to carry its proportion of stress in accordance with the ratio of moduli of elasticity, Chapter VIII., Section 8. Reinforcing bars for compression in beams should be straight and should be two diameters in the clear from the surface of the concrete. For the positive bending moment, such reinforcement should not exceed 1 per cent. of the area of the concrete. In the case of cantilever and continuous beams, tensile and compressive reinforcement over supports should extend sufficiently beyond the support and beyond the point of inflection to develop the requisite bond strength.

In construction made continuous over supports, it is important that ample foundations should be provided, for unequal settlements are liable to produce unsightly if not dangerous cracks. This effect is more likely to occur in low structures.

Girders, such as wall-girders, which have beams framed into one side only, should be designed to resist torsional moment arising from the negative moment at the end of the beam.

7.—BOND STRENGTH AND SPACING OF REINFORCEMENT.

Adequate bond strength should be provided. The formula hereinafter given for bond stresses in beams is for straight longitudinal bars. In beams in which a portion of the reinforcement is bent up near the end, the bond stress at places, in both the straight bars and the bent bars, will be considerably greater than for all the bars straight, and the stress at some point may be several times as much as that found by considering the stress to be uniformly distributed along the bar. In restrained and cantilever beams, full tensile stress exists in the reinforcing bars at the point of support, and the bars should be anchored in the support sufficiently to develop this stress.

In case of anchorage of bars, an additional length of bar should be provided beyond that found on the assumption of uniform bond stress, for the reason that before the bond resistance at the end of the bar can be developed the bar may have begun to slip at another point, and "running" resistance is less than the resistance before slip begins.

Where high bond resistance is required the deformed bar is a suitable means of supplying the necessary strength. But it should be recognised that, even with a deformed bar, initial slip occurs at early loads, and that the ultimate loads obtained in the usual tests for bond resistance may be misleading. Adequate bond strength throughout the length of a bar is preferable to end anchorage, but, as an additional safeguard, such anchorage may properly be used in special cases. Anchorage furnished by short bends at a right angle is less effective than by hooks consisting of turns through 180 degrees

The lateral spacing of parallel bars should be not less than three diameters from centre to centre, nor should the distance from the side of the beam to the centre of the nearest bar be less than two diameters. The clear spacing between two layers of bars should be not less than 1 in. The use of more than two layers is not recommended, unless the layers are tied together by adequate metal connections, particularly at and near points where bars are bent up or bent down. Where more than one layer is used, at least all bars above the lower layer should be bent up and anchored beyond the edge of the support.

8.—DIAGONAL TENSION AND SHEAR.

When a reinforced concrete beam is subjected to flexural action, diagonal tensile stresses are set up. A beam without web reinforcement will fail if these stresses exceed the tensile strength of the concrete. When web reinforcement, made up of stirrups or of diagonal bars secured to the longitudinal reinforcement, or of longitudinal reinforcing bars bent up at several points, is used, new conditions prevail, but even in this case, at the beginning of loading the diagonal tension developed is taken principally by the concrete, the deformations which are developed in the concrete permitting but little stress to be taken by the web reinforcement. When the resistance of the concrete to the diagonal tension is overcome at any point in the depth of the beam, greater stress is at once set up in the web reinforcement.

For homogeneous beams, the analytical treatment of diagonal tension is not very complex—the diagonal tensile stress is a function of the horizontal and vertical shearing stresses and of the horizontal tensile stress at the point considered, and as the intensity of these three stresses varies from the neutral axis to the remotest fibre, the intensity of the diagonal tension will be different at different points in the section, and will change with different proportionate dimensions of length to depth of beam. For the composite structure of reinforced concrete beams, an analysis of the web stresses, and particularly of the diagonal tensile stresses, is very complex; and when the variations due to a change from no horizontal tensile stress in the concrete at remotest fibre to the presence of horizontal tensile stress at some point below the neutral axis are considered, the problem becomes more complex and indefinite. Under these circumstances, in designing, recourse is had to the use of the calculated vertical shearing stress, as a means of comparing or measuring the diagonal tensile stresses developed, it being understood that the vertical shearing stress is not the numerical equivalent of the diagonal tensile stress, and that there is not even a constant ratio between them. It is here recommended that the maximum vertical shearing stress in a section be used as the means of comparison of the resistance to diagonal tensile stress developed in the concrete in beams not having web reinforcement.

Even after the concrete has reached its limit of resistance to diagonal tension, if the beam has web reinforcement, conditions of beam action will continue to prevail, at least through the compression area, and the web reinforcement will be called on to resist only a part of the web stresses. From experiments with beams it is concluded that it is safe practice to use only two-thirds of the external vertical shear in making calculations of the stresses that come on stirrups, diagonal web pieces, and bent-up bars, and it is here recommended for calculations in designing that two-thirds of the external vertical shear be taken as producing stresses in web reinforcement.

It is well established that vertical members attached to or looped about horizontal members, inclined members secured to horizontal members in such a way as to insure against slip, and the bending of a part of the longitudinal reinforcement at an angle, will increase the strength of a beam against failure by diagonal tension, and that a well-designed and well-distributed web reinforcement may, under the best conditions, increase the total vertical shear carried to a value as much as three times that obtained when the bars are all horizontal and no web reinforcement is used.

When web reinforcement comes into action as the principal tension web resistance, the bond stresses between the longitudinal bars and the concrete are not distributed as uniformly along the bars as they otherwise would be, but tend to be concentrated at and near stirrups, and at and near the points where bars are bent up. When stirrups are not rigidly attached to the longitudinal bars, and the proportioning of bars and stirrup spacing is such that local slip of bars occur at stirrups, the effectiveness of the stirrups is impaired, though the presence of stirrups still gives an element of toughness against diagonal tension failure.

Sufficient bond resistance between the concrete and the stirrups or diagonals must be

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provided in the compression area of the beam.

The longitudinal spacing of vertical stirrups should not exceed one-half the depth of beam, and that of inclined members should not exceed three-fourths of the depth of beam.

Bending of longitudinal reinforcing bars at an angle across the web of the beam may be considered as adding to diagonal tension resistance for a horizontal distance from the point of bending equal to three-fourths of the depth of beam. Where the bending is made at two or more points, the distance between points of bending should not exceed three-fourths of the depth of the beam. In the case of a restrained beam, the effect of bending up a bar at the bottom of the beam in resisting diagonal tension may not be taken as extending beyond a section at the point of inflection, and the effect of bending down a bar in the region of negative moment may be taken as extending from the point of bending down of bar nearest the support to a section not more than three-fourths of the depth of beam beyond the point of bending down of bar farthest from the support, but not beyond the point of inflection. In case stirrups are used in the beam away from the region in which the bent bars are considered effective, a stirrup should be placed not farther than a distance equal to one-fourth of the depth of beam from the limiting sections defined above. In case the web resistance required through the region of bent bars is greater than that furnished by the bent bars, sufficient additional web reinforcement in the form of stirrups or attached diagonals should be provided. The higher resistance to diagonal tension stresses given by unit frames having the stirrups and bent-up bars securely connected together both longitudinally and laterally is worthy of recognition. It is necessary that a limit be placed on the amount of shear which may be allowed in a beam; for when web reinforcement sufficiently efficient to give very high web resistance is used, at the higher stresses the concrete in the beam becomes checked and cracked in such a way as to endanger its durability as well as its strength.

The section to be taken as the critical section in the calculation of shearing stresses will generally be the one having the maximum vertical shear, though experiments show that the section at which diagonal tension failures occur is not just at a support, even though the shear at the latter point be much greater.

In the case of restrained beams, the first stirrup or the point of bending down of bar should be placed not farther than one-half of the depth of beam away from the face of the support.

It is important that adequate bond strength or anchorage be provided to develop fully the assumed strength of all web reinforcement.

Low bond stresses in the longitudinal bars are helpful in giving resistance against diagonal tension failures, and anchorage of longitudinal bars at the ends of the beams or in the supports is advantageous.

It should be noted that it is on the tension side of the beam that diagonal tension develops in a critical way, and that proper connection should always be made between stirrups or other web reinforcement and the longitudinal tension reinforcement, whether the latter is on the lower side of the beam or on its upper side. Where negative moment exists, as is the case near the supports in a continuous beam, web reinforcement, to be effective, must be looped over or wrapped around, or be connected with, the longitudinal tension reinforcing bars at the top of the beam in the same way as is necessary at the bottom of the beam at sections where the bending moment is positive.

Inasmuch as the smaller the longitudinal deformations in the horizontal reinforcement are, the less the tendency for the formation of diagonal cracks, a beam will be strengthened against diagonal tension failure by so arranging and proportioning the horizontal reinforcement that the unit stresses at points of large shear shall be relatively low.

It does not seem feasible to make a complete analysis of the action of web reinforcement, and more or less empirical methods of calculation are therefore employed. Limiting values of working stresses for different types of web reinforcement are given in Chapter VIII., Section 5. The conditions apply to cases commonly met in design. It is assumed that adequate bond resistance or anchorage of all web reinforcement will be provided.

When a flat slab rests on a column,, or a column bears on a footing, the vertical shearing stresses in the slab or footing immediately adjacent to the column are termed punching shearing stresses. The element of diagonal tension, being a function of the bending moment as well as of shear, may be small in such cases, or may be otherwise provided for. For this reason the permissible limit of stress for punching shear may be higher than the allowable limit when the shearing stress is used as a means of comparing diagonal tensile stress. The working values recommended are given in Chapter VIII., Section 5.

(To be continued.)

Our Illustrations.

UNIVERSITY COLLEGE OF SOUTH WALES AND MONMOUTHSHIRE, CARDIFF.

The drawing illustrated shows the portions of the whole scheme still to be completed. It includes the great hall, the refectories for students and technical buildings which flank it, including the laboratories of the public health department. These lie upon the opposite side of the courtyard to the ranges of buildings already finished. Mr. W. D. Caröe, M.A., is the architect. The perspective now reproduced was shown at the Royal Academy Exhibition, 1916.

DETAIL OF ELEVATION FOR THE MUNICIPAL BUILDINGS, ARBOUR SQUARE, STEPNEY, E.

This detail is reproduced from the big drawing which was prominently placed at the Royal Academy last summer. The general drawings of this design were published, small scale, in THE BUILDING NEWS for July 7, 1915. We reviewed the competition designs the week previously, when the chosen scheme by Messrs. Briggs, Wolstenholme and Thornely was illustrated in our pages. The authors of this design are Messrs. Ambrose Poynter, F.R.I.B.A., and George Wenyon, M.S.A. They were awarded a premium of £75. Owing to the war the work of erecting these buildings had to be postponed for the present.

THE JAMES SMITH MEMORIAL, WALLASEY, CHESHIRE.

This small clock tower was erected by public subscription to the memory of the late James Smith, who was a generous benefactor to the borough of Wallasey. It forms an entrance from the street to the Quarry Recreation Ground, which lies several feet below the street level. The quarry site was itself a gift to the borough by the late Mr. Smith. The tower is built of local cream-coloured sandstone and roofed with small stone slates. Messrs. Thomas and Sons, of Oxton, Birkenhead, were the contractors. Messrs. Briggs, Wolstenholme and Thornely, FF.R.I.B.A., of Liverpool, are the architects.

THE ROW OF ALMSHOUSES, MARSHFIELD, GLOUCESTERSHIRE.

This undisturbed old historic village in Gloucestershire is about a mile long, and the hamlet has a geographical peculiarity which is most unusual owing to three separate counties touching within its limits. The place went, in fact, by the name of Boundaryfield in Saxon times because of this odd conjunction of Wilts, Somerset and Gloucestershire. Marshfield lies about eight miles from Bath and possesses a spacious Late Gothic church with a western tower of good scale, built by the Abbot of Tewkesbury in the reign of Edward IV. Compared with the church towers of this neighbourhood it cannot claim exceptional distinction, particularly in juxtaposition with the steeple at Cold Ashton, somewhat nearer to Trowbridge. The parish church at Marshfield stands at one extremity of the uncommonly long street, and this row of almshouses terminates this main thoroughfare at the other end. The forecourt-enclosing wall, with the rather imposing middle gateway, adds greatly to the hospitable effect of this suggestive block of tenements. The stone-built tower and spire in the midst of the group capped by the broached roof, supplies an unusually notable feature by being thus solidly constructed. Masonry on such a scale must necessitate a considerable foundation in the centre of the plan. The rigid simplicity of the skyline gives charm to the extreme picturesqueness of the whole composition, which is becomingly relieved by the short solid-looking chimneys. Enhanced repose, due to the long line of otherwise unbroken ridge, adds point to the unassuming row of dormers. The bigger frontispiece gable is relieved by the armorial bearings of the founder's family, a good effect being obtained without any semblance of ostentation. These heraldic enrichments add a richness as well as a permanent interest to the building and a perpetual record. There are several old stone houses in Marshfield Street, and if few are of any special merit individually, all are marked by the Gloucestershire manner of building tradition. The cottages are quaintly gabled with skew-stones, "corbie set-offs" and mullioned window openings. The roofs are stone slated and for the greater part are eminently plain and grey-looking, with stone-framed doorways, such as often distinguish the domestic buildings of the Cotswolds. On Beck's Down, in Marshfield Parish, may be seen some Druidical remains, and in the church are some ancient stone bench seats forming part of the chancel, quite worthy of note, such like not often being met with.

COTTAGE AT LONGFIELD, KENT.

This sheet of working drawings, lent us by the architect, Mr. Sidney K. Greenslade, A.R.I.B.A., of Gray's Inn and Exeter, shows a cottage lately erected in Kent near by the Poultry Farm-house which appeared in our issue for the 10th inst. In general character and materials both buildings nearly correspond, but in planning they are very unlike. Mr. G. W. Bishop's house is long in its proportions with a roomy hall and staircase in the centre, the kitchen and service being to the right and a living room, 19 ft. by 12 ft. 6 in., set on the left hand, with the dining room, facing west, between, and communicating the service by two doors, one at either end. There are three bedrooms, a dressing-room and a bathroom upstairs, spaciously contrived for so moderately-sized a house, and all very carefully worked out in detail. The windows are fitted with casements. In the living-room there is a double fitment for the display of china by side of the chimney-piece, also space for a fixed dresser in the dining-room. A covered way leads to the wash-house and coal place, beyond the larder.

DETAIL OF NOS. 232-233, HIGH HOLBORN, W.C.

This block of business premises is now in course of erection in High Holborn at the corner of Little Turnstile. The war has interfered with the progress of the work, which is in an advanced stage. The elevations are faced in Portland stone, and fire-resisting construction is employed. The accompanying illustration was reproduced from the contract detail of the façades. Messrs. Wallis and Sons, of Maidstone, are the builders, and Mr. Leonard Martin, F.R.I.B.A., of Seymour House, Waterloo Place, Pall Mall, S.W., is the architect.

In the Chancery Division on January 23 Mr. Justice Astbury made the usual winding-up order in the case of the Northern Quarries Company, Ltd.

The valuers and estate agents in Sleaford district have, within a fortnight, completed the land survey in accordance with the wishes of the War Agricultural Committee.

Mr. Douglas T. Thring, Fellow of the Surveyors' Institution, member of the Council of the Land Agents' Society, and formerly of Winchester College, has been appointed Estates Bursar of Merton College, Oxford, in succession to the late Professor Esson. Mr. Thring was elected out of 160 candidates. He will enter on his duties at Lady Day.

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Correspondence.

WEIGHTS, MEASURES, AND CURRENCY REFORM.

To the Editor of THE BUILDING NEWS.

SIR,—The accidental rediscovery of the British 5-link or 39.6-inch metre gives us a new point of departure. We have also found once more, having apparently abandoned "decimals" in the fifteenth century, a 5-metre rod, pole, or perch, a 20-metre Gunter's chain, a 200-metre furlong; and in area units, a square rod of 25, a rood of 1,000, and an acre of 4,000 square metres. In weights we have a metric ton of 2,240 lbs., and the cwt. of 100 half-kilograms (British). With little correction and revision, our capacity units are metrically good and serviceable without any correction at all, as shown in my book "British Trade and the Metric System."

The question before the British public, therefore, boils down to this: Shall we, as an Empire, adopt the French metric system, and scrap or alter all native units; or, shall we re-establish our native British metre, and keep everything else we have? The first can only be done at the most serious inconvenience possible to ourselves and to the subject races; and the second will, comparatively speaking, cause neither us nor them any inconvenience at all.

A further point to be considered is, that in adopting the French metric system, we shall benefit Germany and Austria more than our friends whose manufactures have been ruined in Belgium, Poland, Roumania, and North France. If our Allies would only agree to accept the British decimal or metric system for trade and manufacture, while retaining the French metric system for science and purely national purposes, it seems to me we might establish an international scheme without any delay. We should not upset the Allies, who have to begin anew; and we ourselves should not be upset either.

As regards our own system, my book shows how, when simplified, it becomes probably the best in the world, and the easiest to learn and apply.

I am no longer afraid of the Decimal Association Some of their arguments are invaluable as being equally applicable to the British Decimal system. A perfect system of weights and measures, such as our own, is symbolised by the human hand. The four fingers of one hand, 8 in the two hands, 16 when duplicated by adding the feet, represent the fractional scale. The fingers and thumb together make a "bunch of five," and we get 10, and later 20, the Decimal Association illustration. If we now add-in the wrist, we get six radials to each palm, and ultimately 12 and 24, representing the duodecimal scale. I have shown that the British system is composed of three scales, decimal, fractional, and duodecimal, and that we have produced the "distracting jumble" complained of by metric advocates by our own carelessness and mis-use of tables and scales. We persist in saying 5½ yards (not 5 metres) make a rod, thus mixing up the fractional and decimal scales. We sell wheat by the bushel at so many pounds weight, mixing up tables of capacity and weight. We used to quote for cotton (and may still do so for all I know) in pounds weight and decimals of a penny, both unsuitably low units for the commodity. Stones of 14 lbs. and florins and decimals would give more convenient results. We can just as easily mis-use the metric system, and discredit it in the same ways.

We have also to get rid of all stray local units not included in the regular tables, or else we must standardise them.

As regards currency, it is sufficiently decimal in reason already. Reckoning the florin as 100 cents of account (not coined), the shilling is 50, the sixpence 25, and the threepenny bit 12½ cents. With the aid of suitably high measures of all kinds, according to the merchandise, we should never have to use lesser coins in wholesale trade than cents of account in rates, and threepenny bits in the cash columns.

For the convenience of retail trade, the wage-earner and the middle-class consumer, we divide the threepenny bit into 12 farthings. Since 100 half-kilos (British) are equal to 112lbs., we see at once that the wholesale dealer can supply cwts. of 100 half-kilos at so much a cwt., which rate divided by 100 gives a decimal rate per half-kilo. The retailer turns this into the nearest fractional currency, and knows he can sell each pound weight of the commodity for that amount, and clear 12 per cent.—10 per cent. of profit and 2 per cent. for waste.

The great point I wish to make is this: We already have a metric system and do not need another. It is easy to destroy, and terribly hard to rebuild. By reinstating our native metric system we can get back, and out of it, whenever we wish, or find it healthy, to do so. If we adopt the French metric system it must be for good and all, and there can be no turning back.—I am, Sir, yours, etc.,

E. A. W. PHILLIPS, M.Inst.C.E.

Hove, January 29, 1917.

PROFESSIONAL AND TRADE SOCIETIES.

MASTER PAINTERS' ASSOCIATION IN SCOTLAND.—The retiring president (Mr. Joseph Thomson, Dundee) occupied the chair at the annual meeting of the Association of Master Painters in Scotland, which was held last Friday in the Masonic Hall, 19, Hill Street, Edinburgh. The annual report by the Council stated that the membership of the Association at the end of last year was 304, showing a decrease of 25 on the total of the previous year. There were 13 affiliated Associations. Like other departments of the building trade, there was no doubt that the painting trade had suffered severely again during the past year owing to the war. —The new president (Mr. J. T. M'Arthur, Edinburgh), then took the chair. Mr. James Sellars, Glasgow, was elected vice-president, and Messrs. Cameron and A. S. Calder, Edinburgh, were reappointed general secretary and organising secretary respectively. It was agreed to hold next year's meeting in Glasgow.—Mr. Calder, reporting on the condition of the trade in Edinburgh, Leith, and vicinity during 1916, said it had shown no improvement on that of the previous year.—The new president then addressed the gathering. After referring to the war and trade troubles, he said in their craft, with its varied treatment and finishing of other tradesmen's work, he did not think they flattered themselves in the least when he held that a good painter must be a craftsman of no mean ability, and well worthy of his hire. They were oftimes served with those who painted, but could never be "painters." Yet the men demanded that they should receive the same standard rate as the qualified tradesman, leaving the employers to take the only remedy, of dispensing with their services at the earliest opportunity. Personally, he would prefer to be free to pay the men according to their qualifications, with a minimum instead of a standard rate, which most assuredly would encourage the study of the higher branches of the craft, and make for greater efficiency all over.

TRADE NOTES.

Boyle's latest patent "air-pump" ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, E.C., have been employed by the Wilts United Dairies Company, Limited, Wilts, Somerset.

Messrs. Lewis Berger and Sons, Ltd., of Homerton, N.E., have published an art folder of special interest to architects entitled "Mr. Berger Sees it Through." It is illustrated with photographs of some of the buildings which have been beautified with Matone, and will be sent to you on application.

In these days when all metals are scarce and expensive, the use of reinforced concrete can be substituted with advantage in the building of tanks. We hear that several large concrete tanks have been constructed on the roof of a biscuit factory at Fulham, and that as a precaution against leakage Pudlo has been used to waterproof the cement.

The death is announced on the 27th inst., at Moscow Court, W., of Mr. Edwin Henry Lingen Barker, architect, of heart failure. The funeral took place at Hereford.

LEGAL INTELLIGENCE.

RUBEROID COMPANY'S LIBEL ACTION AGAINST THE "IRISH BUILDER AND ENGINEER" AND MESSRS. ROWLEY AND CO., ADVERTISING AGENTS.—FARTHING DAMAGES AGAINST THE "IRISH BUILDER AND ENGINEER."—VERDICT FOR MESSRS. ROWLEY AND CO.—In this action, which was tried on Monday and Tuesday in last week in the King's Bench Division, before Mr. Justice Rowlatt and a special jury, the Ruberoid Company, Limited, sued Mecredy, Percy, and Co., Limited, proprietors and publishers of the *Irish Builder and Engineer*, Dublin, and Messrs. Rowley and Co., advertising agents, of Avenue Chambers, Southampton Row, to recover damages for alleged libel imputing that the company had German connections, and for an injunction. The defendants denied that the statements complained of were libellous, and said that in their ordinary meaning they were true in substance and in fact.—Mr. Rose Innes, K.C., for the plaintiffs, said several years before the war broke out an American company, known as the Standard Paint Company, manufactured and sold ruberoid, a material which was used for roofing huts and other slight buildings, and which was being supplied by the plaintiffs to the Government of this country at the present time. The American company had a capital of a million sterling, and its business was a great success. They resolved to establish in Europe companies or agencies for the sale of ruberoid, and one of the companies was formed in Hamburg. In 1906 a company was started in this country with the modest capital of £6,000. Three years later it was decided to establish a factory in this country, and the capital of the English company was increased to £20,000. A factory was erected at Brimsdown, Middlesex, and the manufacture was carried out by British workmen. At one time Mr. Gustav Meyer, who carried on business in Germany, was a director of the English company and held a considerable number of shares. That gentleman died in October, 1912, and his brother, Mr. Robert Otto Meyer, was appointed as a director. When hostilities commenced between this country and Germany Mr. Robert Otto Meyer was removed from the directorate, and Mr. Davis L. Irwin was appointed in his place. From that time the directors were either American or British subjects. On January 29, 1916, there appeared in the *Irish Builder and Engineer* the following letter:—

"Sir,—At a time when it behoves all of us to be careful that we are not trading with firms that are of enemy origin, the constitution of limited liability companies is a matter of some importance. May I call your attention to the fact that, according to the particulars filed at the Companies' Registration Office at Somerset House, relating to the Ruberoid Company, Limited, the position as in April last was as follows: The directors of the company were: Ralph Shainwald, 100, William Street, New York; Robert Otto Meyer, 93, Durnhof, Hamburg; Gustav Meyer, Durnhof, Hamburg. The principal shareholders were: Standard Paint Company, New York, 12,698 shares; Edgar B. James, Knightrider Street, 3,400 shares; Ruberoid Company, Davenhof, Hamburg, 3,399 shares; Davis L. Irwin, Bromley, 500 shares.—Yours, etc., Scrutator."

In an editorial comment at the foot of the letter it was admitted that the allegation that the company was of German origin was not a fact; and in a later issue the defendants expressed regret that they had given publicity to the statement. Matters might have rested there, but the defendants published a further letter from "Scrutator," with reference to the directorate of the company in 1915. Counsel submitted that there was no ground for the allegation that the company was of German origin or that Mr. Robert Otto Meyer was a director of the company in April, 1915, and that the plaintiffs were entitled to moderate damages.—Mr. Edgar B. James, managing director of the plaintiff company, stated, in answer to Mr. Justice Rowlatt, that ruberoid was not a patent, but a secret article.—At the adjournment on Tuesday Mr. Edgar B. James, managing director of the plaintiff company, was cross-examined by Mr. Hume Williams, K.C. He said that Mr. Shainwald, of New York, was chairman of the English company, but he had not been to this country since the war began. Mr. Robert Otto Meyer, when he became director of the English company, was managing director of the Hamburg company.—Do you still think it unfair to say that the English company was of German origin?—Certainly. I deny it absolutely.—Mr. Robert Otto Meyer ceased

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to be a director in 1915?—In 1914, seven weeks after the outbreak of war.—Re-examined, witness said he had never heard of Mr. Max Drey. Mr. Robert Otto Meyer was still a shareholder of the English company, and his dividends were paid to the Public Trustee.—Mr. Rose Innes: Is the British Government still dealing with you for ruberoid?—Yes, and the French Government.—I do not suppose you are doing much with Germany?—No.—Mr. Justice Rowlatt: They are getting it from the Hamburg company. (Laughter.)—Mr. Rose Innes: Do any of the patents or trade marks stand in the name of any German or German company?—No.—Was any controller ever appointed by the Board of Trade?—Certainly not.—Mr. Clarence Rowley, one of the defendants, denied that he had any arrangement with his co-defendants to sell or publish their journal in London. Witness obtained copies of the paper for the purpose of obtaining advertisements, and the copies sold by his employee to representatives of the plaintiffs were his own private property. He had no reason to believe that the paper contained any libel.—Mr. Hume Williams, addressing the jury for the defendants, contended that Mr. Rowley was not the publisher of the journal, that he had been guilty of no negligence, and that he was entitled to a verdict. As to the proprietors of the *Irish Builder and Engineer*, counsel submitted that it had been proved beyond doubt that the plaintiff company was of German origin. It was formed to sell German goods and was controlled from Germany, and if that was not a company of German origin he did not know what was. It was said that the plaintiff company was started by the Standard Paint Company, of New York, and that Mr. Shainwald, who was largely interested in that company, was the chairman of the plaintiff company. Were there no Germans trading in New York? Were there no American citizens of German origin in New York? No doubt it was a mistake to say that Mr. Robert Otto Meyer remained a director of the company in 1915, and if the jury thought that the plaintiffs were entitled to a verdict on that ground the smallest coin of the realm would amply compensate them for the damage they had sustained.—Mr. Rose Innes, K.C., in reply, urged that the defendants had failed to justify the allegation that the plaintiff company was of German origin. The term "German," he said, was one of opprobrium, and he hoped it would be so for ever.—Mr. Justice Rowlatt, in summing up, said the question for the jury was whether the defendants were right in saying that the plaintiff company was in substance of German origin. There was no evidence that the gentlemen connected with the American company had a German taint, but there was evidence that the plaintiff company when it was started became a subsidiary company of the American and German companies for the sale in England of goods manufactured in Germany.—The jury found a verdict for Mr. Rowley, and for the plaintiffs against Messrs. Meeredy, Percy, and Company for a farthing damages.—Judgment was entered accordingly, with costs against the latter defendants.

The effect of the war on the Cornish china clay industry has resulted in a reduction on the assessable value of the county of £17,610.

The death is announced of Professor Tom Parry, land agent, in the employ of the Cardiganshire County Council, who twenty-five years ago held the post of director in agriculture at the University College of Wales, Aberystwyth.

Progress with the scheme of the gradual decoration of the interior of Westminster Cathedral has again been interrupted by war. The marbles for the monoliths supporting the vault of the north and south aisles were obtained at great trouble and cost from ancient quarries at Thessaly. As they were being brought down to the coast they were captured by the Turks in the Greco-Turkish War of 1394 and held for some time.

Mr. Anthony White, churchwarden of All Saints', Galley Hill, Swanscombe, Kent, has recently presented several gifts to that church in memory of Earl Kitchener. One is a picture of "The Message of the Angel to St. Joseph," painted by Marcello Venusti, a pupil of Michael Angelo, and the others are four plaster casts of British saints—St. Columba, St. Ninian, St. Bridget, and St. Margaret—the work of the late Mr. Stirling Lee. The originals of these are marble bas-relief figures in Westminster Cathedral.

Our Office Table.

A meeting of the London and Middlesex Archæological Society was held at the Bishopsgate Institute last Wednesday afternoon, when Mr. Mervyn Macartney gave a lantern lecture on St. Paul's Cathedral. Referring to the threatened subsidence, he said he thought that the Cathedral would be all right till someone built an underground restaurant about 90 ft. deep, and then there would be trouble. Mr. Macartney also spoke of the inaccuracies in various acounts of the Cathedral, and especially in the "Parentalia." This extremely unreliable work began by saying that Wren laid the foundations from the west end to the east end before he had any difficulty, but it was the fact that the west end of the old Cathedral was not pulled down for fifteen or twenty years after he started work from the east end, and it was not possible that he could have cleared the site from the west end. Another statement was that Wren "digged" a pit 40 ft. deep and built therein a pier 10 ft. square to support a corner of the building, but modern investigation had failed to reveal any evidence of this structure. The only way of accounting for these errors was to suppose that Wren gave his assent to them when his age made him uncertain of facts and dates.

Owing to the London County Council rule with regard to age, Mr. Leonard C. Nightingale is leaving the Clapham School of Art, of which he has been Principal since its foundation in 1885. During these thirty-one years the school has been highly successful. In the twenty-nine National Competitions (none was held in 1916) it has obtained eight gold medals, thirty-six silver medals, seventy-three bronze medals, and six Princess of Wales's Scholarships. The new Principal is Mr. T. McKeggie, who is transferred from the Lambeth School of Art.

The report of the Committee on Ancient Earthworks and Fortified Enclosures, issued by the Congress of Archæological Societies, states that early last year attention was drawn to the fact that the ancient right-of-way track through the earthwork ring enclosure of Stonehenge was being constantly enlarged by military traffic. The small barrow against the northern side of the bank had already been effaced, and a large segment of the ring on the north-west was threatened with destruction. It was found also that the stability of the stones was endangered by bomb practice in their immediate neighbourhood, to which a fresh crack in one of the smaller recumbent stones might have been due. When the matter was brought to the notice of Lieutenant-General Sir H. C. Sclater he at once gave orders to stop the bomb-practice and to divert the traffic through the enclosure, and his action was endorsed by the War Office.

The work of the U.S. Bureau of Soils has resulted in the investigation and mapping, either in detail or reconnaissance surveys, of 571,463,680 acres, or 892,912 square miles, of soils. During the past year 24,749,440 acres, or 38,671 square miles, in 32 States, were mapped in detail. In every State of the Union several areas have now been surveyed, and one survey has been completed extending across the island of Porto Rico. A special undertaking of the past year was field work for the study of the trucking soils in certain typical areas in New Jersey. Similar work has been begun in the vicinity of Norfolk, Va. In 19 States the work of the bureau is carried on in co-operation with the State authorities. It is expected this work will augment farming acreage.

For many years a number of American cities, says "Engineering News" (New York), have suffered from the nuisance of abandoned canals—not only obnoxious as open sewers, but even worse than useless because their boatless waters took up useful ground in the busy areas of the town. It goes on: "Now several of these communities are finding, or hope to find, a use for these deep water-filled cuts by draining the canal and using the bed for rapid transit or railway lines. In Cincinnati the proposed interurban entrance is on the Miami and Erie Canal there; in Syracuse the old Erie Canal bed will certainly in time become the route of the New York Central through the city to replace the tracks which now are the most disgraceful example of municipal disfigurement in the country; in Rochester the Erie Canal will soon be turned into new channels, permitting the use of its bed for a street railway route. The combined advantages of ridding the city of a nuisance and of obtaining ready made a deprest railway terminal or rapid transit route are of such importance as to recommend the procedure to any city now saddled with an unused canal."

Mr. Walter Leaf, Deputy Chairman, who presided at the annual general meeting of the London County and Westminster Bank, held last Thursday, in moving the adoption of the report, said that the state of affairs shown in it was one of which the bank might be proud. So far as the internal affairs of the bank were concerned, the year 1916 had been one of steady and very profitable prosperity. The net result was that they had not only written down their investments to a point at which they stood that day well under the market price, and paid the same dividend as last year, but they had also been able to resume their practice—a very sound rule—of writing a large amount, £100,000, off their premises account, which now stood at almost the same sum as two years ago. In July, 1914, just before the outbreak of hostilities, their deposits were eighty-seven million pounds; they had now risen to 117 million pounds by steady growth—a wonderful sign of the resources of the country. Acceptance for customers were then a little over £4,000,000, and they had now risen to 6½ millions. But this amount now included very little of the old commercial acceptances, and it was mostly made up of obligations and acceptances undertaken at the request of the Government, and guaranteed by them. In the same way the item of bills discounted, on the opposite side of the account, contained but little commercial paper, the place of which had been taken by Treasury Bills. There was here a diminution of about four millions, which had gone, of course, into investments. There was, moreover, a large diminution in the advances to customers. These stood at 46½ millions in June, 1914, and they were now reduced to about 36 millions. The internal affairs of the bank gave him little to say, and nothing which was not satisfactory. They must not forget that their prosperity was due to circumstances which were wholly exceptional and transitory, and they must never leave out of sight the changes which must follow upon that victorious peace which they all meant to have, and which might, perhaps, come in the end with little warning. With regard to the War Loan, the idea seemed to have got about that success was already assured, and that the small investor, therefore, need not trouble himself about what was sufficiently dealt with by the big men. Such an idea was completely baseless. The loan was not already an assured success; far from it. It had got to be made so in the next three weeks, and everyone in the United Kingdom had got to put his back into the task, or there would be no success at all. Of course, one could very well understand the feeling of the man who says: "I have never been in debt to my banker, and it is a point of honour with me not to be." Such an attitude of mind was in ordinary times highly laudable, but was it too much in the hour of the country's need to ask such a man to sacrifice this little piece of pride when by so doing he would help to bring nearer the day of that victorious peace we were determined to have? If all their customers, according to their means, would come to them ready to lend not only their savings in the past, but, with the bank's assistance, their savings in the future, and above all determined to increase those future savings to their uttermost power, then, and then only, would the loan be an assured success. It all lay in the hands of the small man. It had been well said, and he did not hesitate to repeat it, that what the country wanted was not hundreds of millions but millions of hundreds. He moved the adoption of the report, which was carried unanimously. The retiring directors were re-

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elected and the auditors re-appointed. Cordial votes of thanks to the Chairman and the directors and to the officers and staff were unanimously passed.

"The Value of Drawing to the Scientific Worker" was the subject of a lecture by Dr. F. A. Bather, at the January Conference of Educational Associations, on the invitation of the Royal Drawing Society. As a means of expression, said Dr. Bather, drawing is no less useful than writing to the scientific worker. It is also an important method of scientific work. In the descriptive branches of science the reseacher should be able to draw because he alone understands the points that are to be brought out. Even if he employs a draughtsman, he must make sketches for the artists's guidance, and must have sufficient knowledge of the craft to be able to control the result. The act of drawing directs his attention to features that might otherwise escape notice, and forces him to consider structural relations and meanings. In formulating and checking hypotheses, a drawing or model is of the greatest assistance. This is exemplified in such diverse fields as the restoration of extinct animals and the presentation of crystal structure. Accuracy of observation and an understanding of structure are more important in professional illustration than the skilled conventional technique of the pictorial artist.

In a recent article in the *Canadian Engineer*, it is pointed out that the principal causes for decay in building timbers fall, roughly, under the six following heads :—(1) Placing non-durable timber in moist, ill-ventilated basements or enclosures beneath the first floor, or laying sills in direct contact with the ground. (2) Embedding girders and joists in brick or concrete without boxing the ends. (3) Placing laminated flooring in unheated buildings in a green or wet condition. (4) Covering girders, posts, or laminated flooring with plaster or similar coating before being thoroughly dried. (5) General use of non-durable grades of timber in a green or only partially seasoned condition. (6) Use of even dry timber of low natural durability in buildings artificially humidified to a high degree, as in textile mills. A further element of danger lies in the use of timber infected during storage or which has become infected through neglect after purchase and delivery.

Mr. William Andrews, Watford, Herts, builder, who left estate of the gross value of £37,877, bequeathed small annuities to various churches, adding :—"I, William Andrews, being of opinion that the small success attending Christian work in this town and elsewhere is caused through ministers and others having charge of the churches failing to observe the teaching and example set forth in the New Testament and Our Saviour's words (John xii. 32), and consequently worldliness and formality is increasing inside the churches, I therefore direct my trustees to pay the sums mentioned above only to such churches, missions, or committees who do not use chants, anthems, amens, vespers, etc., in any of their congregational services, or use the new unscriptural 'Sunday-school Hymnary,' or resort to concerts, bazaars, entertainments, or any such things in connection with any part of the Lord's work."

Mr. J. Trevor, whose West End branch was recently at 17, Shaftesbury Avenue, has moved to more spacious premises at 231, Regent Street.

The plaster bust of Lord Kitchener by Mr. R. C. Belt, which has been presented to the National Memorial Committee, was sent to Paris last Wednesday to be cast in bronze by the firm of Barbedienne, to whom the Ordnance Department, by order of the Army Council, have already sent a captured cannon to be melted down for the purpose.

By the enlargement of the main dock at Tilbury, berthage has been provided for three additional ocean-going steamers of 600 ft. or 700 ft. in length, together with the necessary equipment in the shape of railway lines, transit sheds, and electric cranes. This new development at Tilbury is part of a larger scheme of dock extension which the Port Authority has in view when the war is over.

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We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

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When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

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MONDAY, February 5.—Technical for Platoon No. 9 at Regency Street. Squad and Platoon Drill, Platoon No. 10. Signalling Class. Recruits' Drill, 6.30—8.

TUESDAY, February 6.—A Volunteer fatigue party is required to assist the Quartermaster.

WEDNESDAY, February 7.—Instructional Class, 6.15. Platoon Drill, Platoon No. 1.

THURSDAY, February 8.—Platoon Drill, Platoon No. 7. Ambulance Class by M.O., 6.30.

FRIDAY, February 9.—Technical for Platoon No. 10, Regency Street. Squad and Platoon Drill, No. 9. Signalling Class. Recruits' Drill, 6.30—8.30.

SATURDAY, February 10.—N.C.O.'s Class, 2.30, under Company-Commander Fleming.

SUNDAY, February 11.—Entrenching at Otford. Parade Victoria (S.E., and C. Rly. Booking Office) 8.45 a.m. Uniform, haversacks, water-bottles. Midday ration to be carried. Railway vouchers will be provided.

MUSKETRY.—For all companies see notice at headquarters.

NOTE.—Unless otherwise indicated, all Drills, etc., will take place at headquarters.

APPOINTMENTS.—Corporal C. W. Smith to be Section Commander of No. 1 Section. Sapper H. G. Wood to be Corporal, both in No. 3 Co. (dated January 19, 1917). The appointment of Section Commander P. F. Allan is cancelled at his own request.

By order,
MACLEOD YEARSLEY, Adjutant.

February 3, 1917.

Mr. W. H. Horsley, auctioneer, has been co-opted to the Cheltenham Council for the East Ward in place of the late Councillor W. J. Merrett.

The house famine in Huddersfield was emphasised last week, when a solicitor applied for the enforcement of an ejectment order. The defendant said she had a family of five children, and she had tried to get another house, but failed. Houses suitable were refused on account of her five children.

Lieutenant W. Gerald Martin, King's Royal Rifles, who was killed on January 14, in his 28th year, was educated at Hazelwood, Limpsfield, and at Eton. Afterwards he studied with several land agents, and when the war broke out was assistant agent at Ockham Park, Surrey. In November, 1914, he was given a commission in the King's Royal Rifles, and last May was promoted lieutenant. At the time of his death he was acting captain in that regiment.

A "Builder" writes to the *Liverpool Post* to express his hope that compensation to brewers will be accompanied by compensation to builders. He points out how his business, one in the north of Liverpool, is closed down through the restrictions imposed by the Government, but he thinks he might have continued active for a longer period, if the considerable absorption of transport and labour by the brewing trades had been curtailed on the outbreak of war.

The Dublin Castle authorities have received £100,000 as an instalment of the Government's ex-gratia grant for the rebuilding of house property destroyed in Dublin during the rebellion. The property-owners complain of the delay in making the advance. In the absence of information as to the amount of compensation, building work has not yet been commenced in the principal thoroughfares. Two or three houses have been rebuilt in the side streets, but while the number of wooden shops in the main streets is being constantly increased, there is no sign of the erection of any permanent structure.

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THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.

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Currente Calamo.

The recommendation by the Royal Institute of British Architects of the award this year of the Royal Gold Medal to the able French architect, M. Henri Paul Nénot, of 17, Rue de la Sorbonne, Paris, will be hailed with enthusiasm not only by all British architects throughout the Empire, but by all friends of civilisation, of which the mistress art was the earliest nurse and is its chief support. It is one of the consolations, at any rate, in this time of trial and anxiety that the alliance betwen Britain and France, the joint guardians of liberty in Europe, will be further cemented by this tribute to our French colleague, of whose career we shall have later on the honour of giving further particulars, and when, we trust, we may find it convenient personally to acknowledge the esteem in which he is held by all of us.

We have dealt on another page with the present alternatives in regard to the existing house famine. Additional proofs of its growth were given by Mr. A. W. Shelton to the Nottingham Property Owners' and Ratepayers' Federation of that city. As he pointed out, there is a present shortage of half a million working-class houses, and it is growing at the rate of 200 a day, and will grow till the Finance Act of 1909-10 is rationally amended. A contemporary writes that "he and his friends want a monopoly in the remunerative grades of house building, with no legislative restrictions." There is not a word of truth in that statement. All the builder asks for is a free hand. Anyhow, continues his critic, "private enterprise cannot build because there is a Finance Act. Clearly the only alternative is the State or the municipality. With money at present prices, the local authority cannot build with the prospect of obtaining remunerative rentals, even if the Government will allow it to build at all, and everything, therefore, points to State subsidies for municipal housing. We have never liked the idea of a State housing subsidy, and we do not like it now; but if such a subsidy has to be given in order to get houses built it should be given to the local authority rather than the private builder." Curious logic that! No one yet has ever seen houses built by municipalities except at rentals of from 10 to 20 per cent. in excess of those provided by the private builder, and the State, as at Woolwich, builds at far heavier cost, although it flagrantly ignores Acts of Parliament which bind municipal and private builders alike!

As will be seen elsewhere, the London County Council is beginning to look after some of the metropolitan boroughs which are slowing down unpleasantly as regards the removal of house refuse; beginning—and not before it was time—with St. Pancras, which is to be "named" to the Local Government Board. What the consequences will be we do not know, but if suspension followed, as in the case of a recalcitrant M.P., some of us would not be sorry, especially if the L.C.C. could be empowered to take over the work throughout the metropolis, except in the City, where it is always well done. And if the scavenging could be transferred from the control of the somewhat supine satraps of the boroughs to Spring Gardens most of us would rejoice, especially those who live in boundary roads. Last Monday, after the not very severe snowfall, was a time of tribulation both for vehicular and pedestrian traffic throughout London—except, again, in the City, where by midday east of the Griffin a well-swept roadway contrasted brightly with the slushy morass west thereof throughout Westminster. Not that Westminster is quite asleep throughout its area, or Holborn either. In the latter thoroughfare the dashing onslaughts throughout the middle of the roadway of the "Tanks," which charge through the traffic with all the *abandon* of their prototypes at the front, are striking testimonies to the will that must be taken for the deed, if it intenses the terror of the foot passenger, whose beplastered garments take a month of Sundays to brush clean when he reaches home.

Inventors have lately been busy in the building trades, and, pressed by the high prices of materials, etc., much has been done in this way as to reinforced concrete work. Many great improvements in machinery have been discovered by workmen, who, by their very working, know best what is wanted. Sometimes, where an employee has a new idea arising out of the plant and materials he uses in his employment, it is a question whether the inventor or his employer should have the benefit of the resulting profitable patent. Many contracts of service specially provide for this point. Where there is no such clause, the law has to decide between the parties. This occurred in the recent case of "The British Reinforced Concrete Engineering Company, Ltd., v. Lind," before Mr. Justice Eve. There the plaintiff company employed the defendant as assistant engineer. It was a part of his duty to draw plans and design the best method for carrying out work. Upon his employers' instructions, acting for a colliery company, he so designed a form of reinforced concrete block for lining the headings of mines, for which he obtained a patent. The present action by the employers was for a declaration that the invention, as the subject of the patent, was their sole property, and that the defendant held it as trustee for them. In his judgment Mr. Justice Eve said that the defendant, while working for the plaintiffs, had discovered a method which would obviate concreting within the mine, and yet do what the colliery required, which he disclosed to the plaintiffs' chief engineer, and then got out his patent for the invention. A decision was now given in favour of the plaintiffs upon the broad ground that it was inconsistent with the good faith binding as between employer and employed that the defendant, as employee, should retain the benefit of this invention, discovered by him while working in the employment. The defendant will therefore have to hold his own invention and patent as trustee for the plaintiff company. But it is probable that the whole important question will be brought before the Court of Appeal and gone into more fully.

Mr. Donald Maclean, M.P., chairman of the London Appeal Tribunal, last Thursday severely criticised the methods of Government departments who, one after another, had declined to avail themselves of the services of a qualified surveyor. The surveyor informed the tri-

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bunal that one officer at the Hotel Cecil told him that if 300 jobs were open, as many as 3,000 applications were usually received. "The real fact of the matter," said Mr. Maclean, "is that heads of departments do not want to be bothered more than they can help; but if they have men fit for service they hold on to them. What is the good of talking about vast schemes of national service when we see here a little bit of the machinery at work. What they want is not vast new establishments, but some common sense, and that they lack very badly." In granting a month's adjournment Mr. Maclean said, "We will give Government departments another opportunity to utilise a really useful man."

The bursting of a kitchen boiler at Ipswich, with serious results to four persons, unpleasantly emphasises the too common neglect of all concerned in regard to this matter. Kitchen boilers are outside the scope of the Boiler Explosions Acts, and accidents to such are not investigated by judicial authorities unless someone is killed by an explosion. During the severe frost in the winter of 1894-5 more than fifty kitchen boilers exploded, in many cases with fatal results, and none of these boilers was subject to the provisions of the Boiler Acts regarding inspection. In the absence of such compulsory inspection, all kitchen boilers should be fitted with safety valves, which would permit the otherwise imprisoned steam to escape and by the hissing sound produced give warning that the pipes were choked. Such stoppages, which should be borne in mind, may very well happen in the summer also as the result of incrustation or the accidental turning off of a tap.

Most architects and builders have reason from time to time to regret the lack of knowledge on the part of painters of the reasons why work done by them is unsatisfactory, even when what should be skilled labour is employed. We wish, therefore, the widest possible circulation to a very practical booklet published, at fourpence, by the Trades Papers Publishing Company, Limited, 365, Birkbeck Bank Chambers, High Holborn, W.C., entitled "The Fundamental Principles of Plain Painting," comprising notes from lectures delivered by Mr. James Lawrance, Acting Instructor of Painters' and Decorators' Work at the L.C.C. School of Building. First, the author deals lucidly with essential ingredients of paints; next, with the functions they fulfil, then with priming, painting on zinc, the repainting of previously painted work, the sequence of coats in painting, concluding with some notes on paint brushes. Not an unnecessary word is wasted in either chapter, and the information is conveyed in a manner which at once bears witness to the really practical knowledge of the writer and his capability of conveying the same to men of the most ordinary intelligence. A free distribution of the booklet to his workmen, with a kindly word or two, by any employer would, we are sure, be appreciated and profitable.

THE "FAILURE OF PRIVATE ENTERPRISE."

In the "Welsh Housing and Development Year Book" for 1917, just issued, we have yet another indictment of the private builder. The volume is the official record of an amalgamation of two associations, of whose achievements in the past we are ignorant, viz., the Welsh Housing Association, and the South Wales Garden Cities and Town Planning Association, into one body, hereafter to be known as the Welsh Housing and Development Association, to which we wish more activity. At present it is waiting the expected advent of the golden shower which is to refresh the Principality into vigorous growth. Meanwhile we are told that "the uncertainty as to the amount and the price of capital that will be available is, of course, a deterrent to extensive preparatory action. It is probably safe to assume, however, that at least £20,000,000 of State money will be forthcoming on fairly generous terms, and the Welsh Housing and Development Association is putting forward a strong demand for the allocation of not less than £5,000,000 for expenditure on housing in Wales and Monmouthshire alone."

And may quite possibly get it if Mr. Lloyd George remains Prime Minister, and Englishmen and Scotsmen are contented to be taxed for the benefit of their Welsh and Irish brethren, if it will stave off more Sinn Fein rebellions and Welsh colliers' strikes and riots. Then we shall see what we shall see—in Wales, at any rate. Drastic and far-reaching proposals might be formulated, "such as the single tax on the nationalisation of the building industry"; but, after all, it is admitted that "Perhaps the first step to be taken, however, is to remove the chief restrictions on private housing enterprise, for it must not be forgotten that, although such enterprise is hopelessly inadequate, nevertheless it has been and still is responsible for the provision of well over ninety per cent. of all available accommodation." Ninety per cent. done of the work wanted in the past is not a bad percentage, especially when builders have been working for seven years and more with their hands tied behind their backs. That, of course, will be called "exaggeration." We are told that

> "It is claimed by builders and property-owners that the failure of private enterprise is due to the Finance Act of 1909. This, of course, is an exaggerated statement, for in that same year it was found necessary to pass the Housing and Town Planning Act, conferring extended powers on local authorities to enable them to supply the shortage of cottage accommodation due to the failure of private enterprise during previous years. There can be no doubt, however, that the 'people's Budget' did have a very unsettling effect on the property market, with a consequent alarming diminution in the number of new dwellings erected. The necessity for amending the Act by means of a clause providing that no increment duty shall be charged on land used solely for working-class dwellings is now very generally admitted, and it is important that such amending legislation should be passed before building activity is resumed after the war."

Why increment duty should only be remitted on land solely used for working-class dwellings we do not know, or that it is at all likely to facilitate access to cheap land for building sites. It is candidly admitted that "the crux of the problem is one of finance," but it is added that capital is not available from private sources and therefore the State must step in and—take twenty millions out of the pockets of the taxpayers to spend on building houses for *some of them*, with what is left after the good kind gentlemen who will get snug berths under a new "Ministry of Housing," have had their little pickings, at rentals of twenty-five per cent. and upwards over those of the houses put up by the grasping private builder before Mr. Lloyd George made it impossible for him to borrow sixpence!

Now the State assists to-day in three ways; by advancing loans to private individuals, companies, and societies; by lending to local authorities; and by itself through Government departments, as for example, the Ministry of Munitions, undertaking the erection of dwellings. As regards the last mentioned method the dwellings put up at Woolwich are, no doubt, bright and shining examples of fitness and economy! And the more temporary structures rushed up elsewhere will probably prove bargains presently to shrewd buyers of material; but we doubt whether any such course of action is likely to prove permanently successful. The second alternative is a better one, but its comparatively infrequent adoption by local authorities is due proof that it is seldom likely to be tried. The first means jobbery, and the almost certain result that in many cases huge blocks of buildings would be thrown on the Government's hands by bankrupt societies and companies. For the private builder we have never asked facilities which are not open to any other man of equal enterprise and character. If the State will lend him money on fair terms he will borrow it. All he asks and has asked for several years is that he shall not be taxed over and beyond his fellow citizens, and that he shall not be hampered by out of date local by-laws.

We have given many instances in the past of the different results obtained by employing the decent private builder and invoking indirect or direct State aid, and they have always proved that in nine cases out of ten neither the State nor the municipality can beat him. One of the most recent will be found on page 581 of our issue of December 27, whereon we contrasted the houses built at Saltley at or under 6s. 9d. per week by a private builder, and the total and lamentable stoppage of the erection of many much caused by the disastrous East Birmingham Town Planning Scheme, suggested by Mr. John Burns on November 25, 1913, as a model to the eighty Greater London Authorities. We hope at any rate the Welsh Housing and Development Association will not spoil sport in that fashion.

There is one article in the year-book which we have read with great pleasure, and that is the plea made by Professor Fraser Storey, F.R.S.E., of University College, Bangor, for afforestation in Wales. If his statistics are reliable, and we see no reason to question them, Wales might, with help, supply us with no small part of the thirty-five millions' worth of timber we import annually in ordinary times, and for want of which we are in sore straits to-day. Professor Storey gives some very useful hints on the best varieties to plant, and he reminds us that, in considering the suitability of Wales as a district for afforestation, it must always be remembered that we have a great asset in the small holdings which are such a feature of Welsh agriculture. On the Continent, where forestry has so long been practised with success, most of the labour employed in the forests comes from small holdings, and much the same system would work very well in Wales. Forestry provides the small-holder with a means of increasing his income by remunerative labour during the winter season, when work on the farm is not at full pressure. The forester, on the other hand, cannot plant and does not care to

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fell trees during the summer. At the conclusion of the winter's operations he, therefore, gladly releases most of his men for work in the fields. It is highly improbable that any considerable addition to the present number of small holdings can be made successfully without the support of forestry. Now forestry is most certainly one of the very few things which might be taken in hand by the State without injury to private interests. The presence of State forests managed systematically has a steadying effect on the timber trade of the district, local industries are encouraged to spring up where regular supplies of the raw material are assured, and owners of private woods in the locality benefit from their observation of new methods and obtain technical advice from the forest officers in charge. We quite agree that it would be a great mistake for the State to do anything which would alienate the sympathies of the private owner. Those who are willing to afforest should receive every consideration and assistance. Buying and selling of timber is no part of the duty of a Government. Even when buying for itself, one recent instance proved that it was an unwise thing to do. But to foster the addition to the national capital and revenue which the re-establishment of an adequate home timber supply would prove would be a refreshing piece of true finance, and a solid and satisfactory contrast with that of recent years.

Mr. G. Prout, surveyor to the Wiveliscombe (Somerset) Urban District Council, has resigned owing to ill-health.

Captain Prior, R.E., inspector and surveyor to the Sevenoaks Rural District Council, has been awarded the Military Cross.

It has been decided by the St. Ives (Hunts) Town Council that the inclusive salary of the borough surveyor (Mr. H. J. Softly) shall in the future be at the rate of £125 per annum.

The St. Pancras Borough Council have passed a resolution offering their heartiest congratulations to Mr. W. N. Blair, their borough engineer and surveyor, on his 25 years' service with them in that capacity.

Miss Amy Edith Clarke, of Newton Road, Bayswater, W., who died on December 23, daughter of Mr. Joseph Clarke, architect, left estate of the gross value of £19,372, of which £19,170 is net personalty.

As a result of a conference in Glasgow between the local Master Painters' Association and the District Committee of the Scottish Painters' Society, it has been agreed to advance the men's wages in the district by 1d. per hour, making the rate 11½d., as from February 1.

Twenty women carpenters, who have gone to build soldiers' huts in France, are but an advance party for the many other women who are anxious to help the Army in this manner. The women, who have been trained by Mr. W. G. Tarrant, of Byfleet, left Charing Cross on January 30.

In the latest meeting of the Budget Committee of the Prussian Diet precautionary measures were recommended with regard to the safety of art monuments against enemy air attacks, and more particularly facilities for the speedy removal in case of need of the irreplaceable treasures of the Cathedral at Aix-la-Chapelle.

The death is announced of Mr. Thomas Wharrie, formerly of the firm now known as Messrs. Wharrie and Colledge, civil engineers and land surveyors, 109, Bath Street, Glasgow. On the formation of Hillhead into a burgh he was appointed burgh surveyor, a position which he held until the burgh was amalgamated with Glasgow.

The Exeter Road, which is to be improved and in part rebuilt by German prisoners of war, recalls the fact that the road was previously improved about a hundred years ago, also by prisoners of war interned at the camp in Dorset. They made the magnificent stretch of road from Dorchester to Weymouth, with its avenues of chestnut trees, and also the section of the main road between Wareham and Bridport.

NOTES ON EFFLORESCENCE ON BUILDINGS AND STRUCTURES, TOGETHER WITH THE MEANS OF COMBATING IT.*

BY C. S. WAITE.

Trouble due to efflorescence on buildings of all kinds is not an uncommon thing in the Punjab and Northern India, and if the evil can be cured by improvement in the manufacture of materials, or counteracted, once it has appeared, by taking special precautions or adopting preventive measures, we shall be practising true economy by reducing the annual expenses of maintenance. The facts narrated in this paper are based on experience of a dwelling house in Lahore, where the experiments have now been carried on at intervals over a period of twelve months.

The house stands well, in that it has a plinth of about two feet, while the surrounding compound is well drained. The walls are of considerable thickness; the house was built some forty years ago, and the bricks vary in size from the old-fashioned Lahore brick 2 in. or so in thickness, to the ordinary brick 9 in. × 4½ in. × 3 in. The proportion of mortar used was liberal, and the thickness of the plaster on the walls and floors varied from ¾ in. to 1¾ in. This great thickness of plaster made the application of remedial measures a task of some difficulty, owing to the liability to crack; and extraordinary care had to be taken in applying new plaster. The floors of one or two of the rooms which gave further trouble last rains were recently taken up in places, and it was found that there was no concrete under the bricks, which had been laid flat on the earth filling.

The house was put into thorough order during the autumn of 1913, when the old plaster was removed from the floors as well as from the walls to a height of five to six feet, and was replaced by fresh plaster of kunkar lime and sand, except in the drawing-room, where the new wall plaster was of cement and sand, as it was intended to paper this room, and the efflorescence has been strongly marked.

During the rains of 1914, which were fairly heavy in Lahore, it became evident that the repairs of the previous autumn had not improved matters, particularly in the drawing-room, where the wall paper was ruined, and large brown patches appeared over the greater part of the area which had been treated with cement. In this room the floor also gave such trouble that eventually it was found necessary to remove carpets and drugget, and as after every heavy shower of rain there were patches of moisture almost amounting to pools, the room was, perforce, abandoned for the time being.

The author was asked to remedy this undesirable state of affairs in October, 1914, and after the winter and spring rains further remedial measures in certain parts of the house were tried in April, 1915. These, again, were partly successful, and the weak spots disclosed have recently been treated in other ways, which are now to be described.

It will be understood that the work carried out has been experimental, less drastic methods being tried first, to save expense, if possible, and the more radical measures being only adopted when the first had failed.

It is evident that, if the disintegration due to the efflorescence so commonly seen on the surface of structures of all kinds is to be successfully combatted, we must obtain full knowledge of its composition by chemical analysis, and this again entails analysis of the brick clay and the constituents of the mortar used.

The clay from which bricks are made in the neighbourhood of Lahore contains potassium nitrate, soda, magnesium salts, and other impurities. Owing to the fact that bricks are generally burnt at too low temperature, and that there is a slight deficiency of silica in the clay, the brickwork develops efflorescence which has a destructive action on bricks and plaster. The object of the experiments now to be described was to counteract this destructive action.

* Paper read at the Punjab Engineering Congress Lahore.

TREATMENT OF POINTED SURFACES.

The brickwork in the plinth and floors of the verandahs (which were unplastered) was washed with dilute hydrochloric acid (1 to 3)—three coats being applied over the whole surface—but before applying the wash all joints were pointed with a mortar made of two and a-half parts by volume of freshly slaked stone lime, two and a-half parts of well washed dry sand, one and a-half parts of boiled linseed oil, prepared as stated below. This work was done in October, 1914, and up to the present time (November, 1915) there are no traces of efflorescence, nor have the bricks disintegrated. The pointing, too, is very hard, and as good as on the day it was put in.

Washing the bricks leaves a thin film consisting of chlorides of various sorts, including magnesium chloride. As fresh efflorescence reaches the surface the magnesium oxide carried with it combines with the magnesium chloride already formed, and an oxychloride cement is produced as a thin film on the surface, as well as to some depth in the capillaries of the bricks, thus preventing the action of moisture and the rising of fresh salt to the surface.

The mortar used in pointing was a lime soap mixture, i.e., slaked lime and free oil, resulting in a reaction taking place between the efflorescing salts and the lime soap, when corresponding salts of lime were produced, and the salts converted into soap.

As the potassium and sodium salts in bricks are converted into caustic alkalis in the process of burning, they would at once form soaps on applying the mortar, a proportionate part of the soap lime being converted into caustic lime, which, again, is slaked by the free water in the mortar before it has set. The free oil protects the work from atmospheric moisture, and prevents further capillary action in the brick.

TREATMENT OF PLASTERED SURFACES.

Preparation of the Plaster.—The sand must be washed and very thoroughly dried before being mixed with the requisite quantity of freshly-slaked lime. After thorough mixing, boiled linseed oil is added, and the compound again well mixed before being put into a pan on the fire for twenty minutes, by the end of which time the mixture should be on the point of boiling, and of a consistency suitable for spreading. During this process the fire should not be too fierce, and the mixture should be constantly turned over with a trowel so as to ensure the gradual absorption of the oil by the lime and to prevent any portion sticking to the bottom of the pan.

The Drawing-room Floor.—In the drawing-room floor, the original state of which has already been described, the method adopted consisted in removing all old lime and plaster (the latter about ¾ in. thick), raking out and cleaning all joints in the brickwork, and pointing with a mortar of lime, sand, and linseed oil. After the pointing was completed, a plaster ¼ in. thick, made of lampblack, sand, and cotton-seed oil was applied in the ordinary way, the surface being worked smooth with floats. The plaster was made by adding five parts of lampblack and seven parts of cotton-seed oil to thirty parts of dry, screened and washed sand. These ingredients, having been well mixed, were put in a pan and placed on a fire for forty minutes, care being taken to stir the mass continually whilst it was being heated, and that an even heat was applied—the temperature being about 2800° F.

This has been found to be very effective, forming a hard slate-like surface, and since it has been laid the former trouble has entirely vanished. The probable action is principally, if not entirely, mechanical, the oil and lampblack filling the capillary pores in the bricks, thus preventing salts and moisture from rising to the surface. Over this was laid another coat of plaster similar in composition to the mortar used for pointing the brick.

The Drawing-room Walls.—To remedy the trouble on the drawing-room walls, the plaster was entirely removed to a height of six feet from the floor, whilst all the joints in the brickwork were also raked out to a depth of half an inch. The walls thus ex-

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posed were washed with a solution of gum shellac and soda crystals, composed of 2 lb. of soda crystals and 7 lb. of gum shellac to 12 gallons of water, which was heated in a pan over a fire, but not allowed to boil. The solution, when ready, must be kept in a well-closed can. When applied as a final outer coating, one gallon of this solution is mixed with one gallon of any ordinary paint and applied as such, but in the case of the drawing-room walls the mixture was applied without any paint.

The probable action consists of an entirely mechanical closing of the capillary pores—thus preventing the formation of efflorescence on the surface—the soda forming a solvent for the shellac.

The brickwork thus having been protected, plaster was applied in thickness of half an inch at a time, each layer being thoroughly beaten in the usual way.

This plaster was composed of 42 lb. of ordinary rosin, 2½ gallons of raw linseed oil, 10 lb. of paraffin wax, and 38 lb. of freshly slaked lime, mixed and boiled for fifteen minutes before being applied. After it had thoroughly set—i.e., in about four days—the surfaces were faced with a coating of burnt gypsum (calcium sulphate) and fresh slaked lime in the proportion of three parts of lime to one of gypsum, and it is of importance that this plaster should not set too quickly. To ensure slow setting, the surface should be brushed over with a weak solution of citric acid (1 to 9). The surface will sweat for at least five days, and the damp, as it appears, should be removed with pads of muslin or some soft substance. When the plaster is quite dry, a highly polished surface can be produced by rubbing it with powdered pumice.

Artificial Rubber Solution.—In dealing with the floors of four other rooms, it was decided, for the sake of economy, to apply the plaster of rosin, raw linseed oil, paraffin wax, and slaked lime for a width of 12 ins. from the walls, and over the whole floor surface of the room to try an "artificial rubber" solution, which the author had used in many other cases with complete success.

The recipe is as follows:—2 lb. boiled linseed oil, 1 lb. cotton seed oil, 2 lb. petroleum, 2 lb. raw turpentine, 2 lb. sulphur. These ingredients should be mixed in a can, and must be boiled for two hours. Owing to the inflammable nature of the contents, care must be taken to use a can which will hold at least eight times the quantity to be boiled. The mixture, as it approaches boiling point, rises very rapidly in the vessel, hence the necessity for this precaution. When ready, the mixture should be applied as a paint.

While there are no signs of damp or efflorescence on the width of 12 ins. next the walls, the rubber solution on the rest of the floors has been destroyed, and the efflorescence is as bad as before. It is evident, therefore, that the rubber solution does not prevent the moisture from penetrating, and the floors have since been treated in a manner similar to the drawing-room floor, the whole of the existing plaster being removed.

Dados.—All the walls to a height of 6 ft. from floor level were rendered with a plaster of rosin, raw linseed oil, etc., similar to that used in the drawing-room, and were finally finished with a wash of different colours. The basic wash is of stone lime, which must be slake with boiling water in a covered vessel, to retain all vapours. When ready, six quarts of the slaked lime are passed through a very fine sieve, and to this is added one quart of rock salt and one gallon of water. The mixture must then be boiled and skimmed. To every five gallons thus prepared is added, by slow degrees, one pound of powdered alum and half a pound of copperas (sulphate of iron), also three-quarters of a pound of potash; to this any colour can be added.

The object in keeping the vessel covered is to prevent any lowering of temperature which would check the slaking of the lime and thus weaken the product. It also prevents the loss of a considerable quantity of finely divided lime, which would otherwise be carried away by the vapour. Nearly every lime contains an appreciable quantity of magnesia. The addition of sodium chloride (rock salt) causes the gradual formation of magnesium oxychloride, and possibly other oxychlorides which greatly strengthen and harden the wash. The addition of powdered alum causes a precipitation of gelatinous alumina, and this precipitate is subsequently partly or wholly dissolved by the addition of potash, forming a glutinous "size." The addition of copperas is chiefly for the purpose of putting colour into the wash. It is also probable, however, that some chemical action is evolved—the alum and copperas parting with a portion of their sulphates and combining with the lime to form sulphate of lime, which, it is known, improves lime, plaster, and washes, and protects them from the destructive action of outside agency.

Alternative Treatment.—In one small room which was in a very bad condition, both as to the floor and the walls, a slightly different method was adopted. The old plaster on the walls was not removed, but was entirely rubbed down from ceiling to floor with wire brushes so as to get rid of all decayed plaster. A wash of green vitriol (sulphate of iron)—one part of green vitriol dissolved in three parts of water—was then applied to the surface in two coats, with twenty-four hours between each application. Forty-eight hours after the second coat had been given, two coats of the artificial rubber solution were applied, and the room was finally treated with the same colour wash as the other rooms.

The floor was of brick laid flat. All joints were raked out and two coats of vitriol solution were applied, after which two coats of the rubber solution were used. This treatment has been entirely successful, and there are no signs of damp or efflorescence. In considering the probable action of the green vitriol wash on the brick floor, the author is of opinion that the caustic salts, on meeting the solution, are converted into sulphates, and a film of hydrated oxide of iron is formed. This film evidently acts as a protective coating, and prevents further capillary action.

With regard to the lime plaster on the walls, the author is of opinion that sulphate of lime is formed, with a protective coating of hydrate of iron.

Further experiments are being made with a wash of ammonium carbonate to be applied to lime plasters immediately after the plaster starts setting. The solution of carbonate of lime, which is the natural hardening process, and thus renders it more quickly impervious to destructive agencies.

PREVENTIVE MEASURES IN NEW BUILDINGS.

The following notes may be of use to anyone deciding to apply the remedies herein discussed to new buildings during the course of construction:—

On completion of the concrete in the foundation, a half-inch layer of lime soap plaster should be spread over the top surface. While this plaster is fresh a layer of brickwork should be laid on it, care being taken to see that the bricks are fairly dry so as to ensure cohesion. When the walls reach floor level, a layer of concrete should be spread over the whole area of the building to form the floor, the idea being to have a continuous floor, without breaks at every dividing wall, as any joint which cracks may later prove a source of trouble. The concrete should be about four inches thick. Over this lime soap plaster should be spread to a thickness of about half an inch. If it is intended to have a brick floor, then the plaster should be spread over the bricks, care being first taken to thoroughly rake out all the joints. The final plaster of lime soap can be laid on walls and floor at one and the same time. Before fixing the door and window *chowkats*, the sides of the openings should be plastered with lime soap, taking care to rake out all joints in the brickwork before applying the plaster.

All the walls for a height of about four feet should have the joints well raked out and pointed with lime soap mortar, and when this has set, they should be washed with a solution of hydrochloric acid or sulphate of iron. About half an inch of the lime soap plaster can then be applied to the height treated. Great care must be taken when joining on the ordinary lime plaster to the lime soap plaster—an overlap of about three inches is advisable to avoid the possibility of a crack developing.

BRICKS.

The author has hitherto been chiefly considering the case of a building already in existence, but it would obviously be better, if possible, to do away with the presence of deleterious salts in the brick itself, and with that object in view he would offer the following remarks:—

Among all the phenomena giving rise to the imperfect products which makes the manufacture of a good brick difficult, the most troublesome are the saltlike efflorescences so hard to remove, even when present in very small quantities. They are found chiefly in places promoting rapid evaporation—that is, on the corners and edges of walls. They make the manufacture of a weather-resisting brick more difficult and uncertain, since they cannot be detected by the unaided eye before burning, and only become visible later on, especially in the case of clays which are not highly coloured in their raw condition. Not only does the water which is used for the softening of brick clay contain, without exception, a varying quantity of mineral constituents in solution, but the clay itself has the power to retain substances soluble in water, which are formed by the never-ending decomposition in the brick clay, and the more plastic a clay is the more will it. If the clay has been allowed to weather during the winter, further opportunity is afforded for the formation of additional soluble salts, espeçially when iron sulphate is present as well as potash, soda, magnesium salts, carbonate of lime, or calcium sulphate. The removal of these salts is not affected to any appreciable extent by atmospheric precipitates (though this is presumed by many) because the moistening of clay makes it impervious, preventing "leaching" of any kind, and, secondly, because the process of formation of the salt goes on for years.

The formation is specially facilitated by the exposure of clay in cold weather, and becomes most energetic when the clay has been brought to a workable condition suitable for manufacture. The removal of the soluble salts formed in the winter or during the rains by washing can therefore be only very superficial, and other industries have shown the impossibility of removing even approximately soluble compounds from substances possessing physical properties similar to clay. The effect of soluble salts becomes the more deleterious since the process of formation goes on during the working of the clay and the drying of the bricks. Such varieties of saline clays have also a special tendency to give rise in the kiln (during technically called the "water smoking process," which invariably starts in the first seven lines of bricks ahead of the firing lines) to saltlike efflorescences. Since the evaporation of the water on drying can take place only at the surface, or to a very slight depth in the case of sandy or porous clays, all the moisture must first be taken to the surface by capillary attraction before it can be evaporated, and thus the salts taken into solution are brought to the surface, where they remain. The denser the solution of the salts, the closer to the surface will they be deposited. The salts thus segregated, after the removal of the water, form a dusty coating of crystals of microscopic size, which are very difficult to observe with the eye, especially when their colour is similar to that of the clay, because they enclose a clayey substance within their aggregations.

Such salts are by no means easy to remove either mechanically or chemically. Mechanical means may be employed in the case of efflorescence or discolorations which do not adhere very firmly, but chemical means imply an exact knowledge of the chemical composition of the deleterious salts, which are at times visible after burning—being usually of a greyish colour—but they are then firmly burnt into the brick.

Owing to the slight consideration which has hitherto been given to the soluble salts contained in brick clay, probably due to their volume being so small, the chemical composition of this part of the clay has never received proper attention, though it is of great im-

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portance, inasmuch as it is only by the application of such knowledge that the salts can either be converted into soluble and harmless compounds, or decomposed in the process of burning.

Careful examination has shown that the soluble salts contained in bricks are concentrated on the surface. The author had two samples of clay from the vicinities of existing kilns in Lahore treated, and sent for analysis; one was a grey and the other a blackish clay. After exposure to the air for some time in the raw condition, both showed a distinct salt-like efflorescence on the corners and edges of the lumps.

In order to determine the nature of this efflorescence a quantity of the clay was boiled in distilled water, and, after settling, the perfectly clear liquid was evaporated to dryness, and the salts obtained sent for analysis. The salt obtained from the grey coloured clay was crystalline, darkened by organic matter, and was slightly deliquescent—that obtained from the blackish clay was yellowish green, extremely hygroscopic, deliquescing in short time to a syrup-like fluid in the presence of moisture. The composition of these salts was found to be, in the first case, lime, potash, magnesium, ferric oxide salts, and alumina, and in the other, calcium sulphate, potash, soda, lime, magnesium, iron sulphate and alumina.

It is thus seen that all the salts in the grey clay possess a decided tendency to crystallise, and we might therefore expect that in a brick made from this clay there would be an undesirable tendency to produce efflorescence, with consequent injury to the brickwork. In the darker coloured clay the deliquescent salts of iron and alumina predominate. These crystallise themselves with difficulty while they interfere with the crystallisation of other salts, and are thus less injurious.

The samples analysed, however, were returned together with fresh samples for further investigation, as the author did not feel quite satisfied with the results of the first analysis.

All the salts can be decomposed by burning at a temperature of about 700 degs. F.; and, when decomposed, they will combine with the silica in the clay to form a compound solution of lime and the different alkalis.

The author would suggest that chemical cones (Segers for preference) be used for testing the degree of heat in the kiln, as, with these cones, a registered temperature can be kept in each chamber of a continuous kiln, and thus the decomposition of soluble salts present in the clay can be ensured during the process of brick burning.

THE MAIN DRAINAGE SYSTEM OF LONDON.*

By GEORGE WILLIAM HUMPHREYS, M.INST.C.E.

Two papers dealing with the Main Drainage System of London are to be found in the Proceedings of the Institution. Sir Joseph Bazalgette in 1865 described the creation of intercepting sewers which had been constructed shortly before that date, and Messrs. Worth and Crimp brought the subject up to date in 1897. The present position of the undertaking, at the end of 1916, is described in this communication. London was originally drained by means of the old open tributaries of the Thames, examples of which are the Counters Creek, the Westbourne, the Kilbourne, the Fleet, the Walbrook, etc., and these tributaries, although covered in, perform the same function today. At a later stage cesspools were introduced. Following upon the introduction of the water-closet in 1810, the overflow from the cesspools into the sewers, at first prohibited, became permissive, and in 1847 became compulsory. Cesspools were then abolished, and the state of the Thames became offensive by reason of these streams discharging within the boundaries of the Metropolis. In 1855 and 1858 the Metropolis Management Acts were passed, whereby the Metropolitan Board of Works was constituted, and *inter alia* was charged with the duty of providing and controlling a set of main or arterial sewers to drain the Metropolis, a similar duty as regards local sewers being entrusted to local parishes or vestries. A system of large intercepting sewers, which ran from the west of London, was decided upon and constructed. They discharged into the Thames at points below the Metropolis, the outlet for the northern side of the Thames being placed at Barking, and that for the southern side at Crossness. The discharge was effected on an ebbing tide, the sewage in the tidal intervals over the period of high water being stored in reservoirs at the outfalls.

In 1884 a Royal Commission reported as to the state of affairs then existing, the discharge of crude sewage into the river at the new outfalls having been found to produce disagreeable effects, owing to the time taken for the discharge to reach open water, due to the daily tidal oscillations. In consequence of this report, works were undertaken to obtain precipitation of the sewage at the outfalls, the resulting sludge being taken out to sea and discharged in the vicinity of the Maplin Sands by means of specially constructed vessels.

Since 1897, the date of the last communication to the Institution, the London County Council, constituted in 1889, has carried out many large and important works for the enlargement of the system and the amelioration of the drainage conditions over the large and populous areas now drained. During the first ten years of that body's existence many important works were undertaken, but in 1899 it adopted a scheme, framed upon recommendations put forward by Sir Benjamin Baker and Sir Alexander Binnie, to enlarge the arterial system, at an estimated expenditure of £3,750,000; and in 1903 it decided to expend, as a complement to these works, another £737,000 on a scheme prepared by Sir Maurice Fitzmaurice for storm-water drainage sewers and works. Upwards of £4,000,000 has been expended on this scheme up to date, the advent of the war having delayed completion of certain works. The old intercepting and outfall sewers, both on the north and on the south side of the river, have been practically duplicated, and large provision has been made for the dealing with heavy rainfalls by the provision of storm-water sewers and pumping stations. Altogether about eighty-seven miles of sewers, the greater length of which consists of large main lines, have been constructed by the London County Council. Dependent as London is upon the tidal level in the Thames for a drainage discharge, the existence of a large area of twenty-one square miles in the heart of the Metropolis, the level of which is below very high water, and ten square miles of which is below the level of an average high water, makes the storm-water drainage problem a difficult one to deal with completely. The Legislature has recognised this by imposing restrictions on the erection of dwelling-houses on the low-lying area when certain conditions prevail. The author is of opinion that there is need for further legislation in order that the problem may be satisfactorily dealt with in the future, and that further provision will have to be made in the direction of providing additional storm-water outlets to the Thames, the provision made as regards intercepting sewers probably being sufficient for many years to come.

Several features of great interest presented themselves during the construction of the new intercepting sewers. The most marked was the comparatively small disturbance caused to the general community during the progress of the works, carried out as they were through the most populous parts of the Metropolis. A system of tunnelling was adopted wherever possible, and very long drives were made, reaching in one case up to 6,129 ft. Wherever sewers passed near to valuable properties the tunnel was driven with a shield and cast-iron segments were inserted, lined on the inside with concrete and brickwork. This method of construction proved also very valuable where bad ground was encountered, the Thanet sands heavily charged with water being satisfactorily dealt with by these means. The highest class of workmanship has been insisted upon even in small details. Where, owing to the lapse of time, defects have developed in the old works, improvements have been effected, but the main features of the scheme laid down and initiated fifty years ago remain to-day in their original form, and have an equally long prospect of utility before them.

The population of the Administrative County of London at the last census (1911) amounted to 4,500,000, in round figures. The London County Council has admitted to its drainage system the sewage from certain outlying areas, as in fixing the county boundaries considerations of watershed areas were not adhered to. In agreeing to drain these outside areas, the proviso has generally been made that only sewage to the extent of about 50 gallons per day per head of population on the area served is to be delivered and dealt with. Storm-water flow is therefore excluded. The system therefore dealt with an estimated population of 5,334,731 in 1911, and the indication given of change in these figures at the present date (1916) is that, as regards the county area there is a slight diminution, while there is an increase in the out-county areas. The total quantity of sewage computed to have reached the outfalls was about 200,000,000 gallons a day in 1894-95, and 280,000,000 gallons a day in 1914-15, an increase of 80,000,000 gallons per day over the discharge of 20 years ago. Compared with the past, this is composed in part of rainfall that formerly was discharged by means of the old river-valley sewers and was not intercepted.

The effect of the elimination of the greater part of the suspended solids at the outfalls and their conveyance to sea as sludge, when this operation was in working order in or about the year 1893 was immediate. The change in the condition of the foreshores and the river has been remarkable. The cost of removal of the sludge to sea during the past ten years was on the average, for working alone, 3.8d., or, including capital charges, 4.4d. per ton of sludge dealt with. The cost of precipitation over the same period has amounted, on an average, to £1 3s. 4d. per million gallons dealt with, including capital charges. The discharge of the sludge in the outer estuary of the Thames has been accomplished without any prejudicial results, and certainly by no other method could a like result, as regards low cost and immunity from nuisance or harm, have been attained. The London County Council has purchased about 750 acres of land in the neighbourhood of and surrounding its outfalls. This has the effect of isolating the outfall works, and at the same time the land would be available if, later on, future developments should demand the treatment by tried bacterial or other processes of either some portion of the effluent or the sludge.

The capital outlay on the system over the period 1856 to March 31, 1914, amounted to about £12,500,000, of which approximately one-half has been repaid. The net expenditure for maintenance for the year 1913-14 was £303,402, towards which out-county areas contributed £28,467. The rate charges for main drainage services (capital and maintenance charges) in the county area amounted to 3.355d. In addition to this, Londoners pay the local drainage rate, which, roughly speaking, is 1d. in the £ averaged over all the borough council areas.

*Abstract of a paper read at the ordinary meeting of the Institution of Civil Engineers on Tuesday, February 6, 1917.

The Metropolitan Water Board's deficiency in revenue rose last year from £85,000 to £224,000, largely due to coal costing more.

The Auctioneers' and Estate Agents' Institute have established a War Assistance Bureau, which is now in operation at 34, Russell Square, under a committee of management with the assistance of a retired London practitioner, who is daily in attendance.

At Bedford Town Council the Public Works Committee recommended that the borough surveyor be authorised to intimate to owners, occupiers, and agents of property that, where desired, the work of making good defective fittings could be done by corporation plumbers at the cost of the persons giving the orders. The recommendation was adopted.

AN ARCHITECT'S HOUSE, LONG WITTENHAM, NEAR ABINGDON, BERKS.
Mr. E. Guy Dawber, F.R.I.B.A., Architect.

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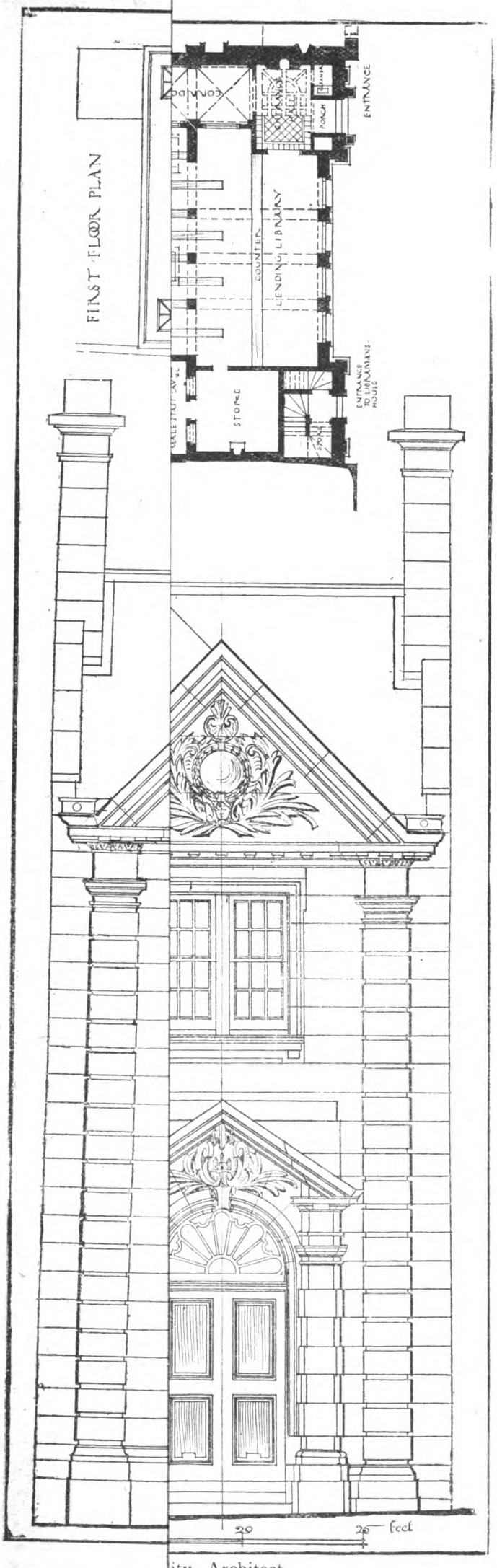

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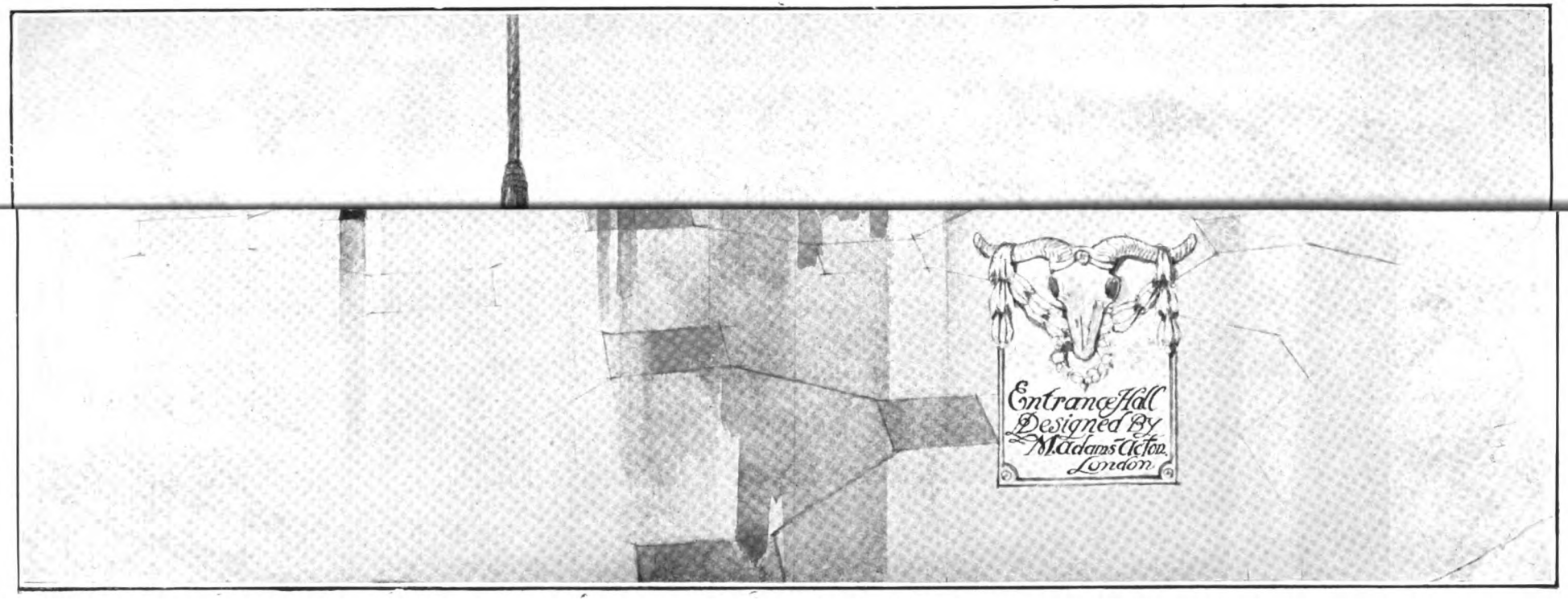

AN ENTRANCE HALL AND FURNITURE.—Designed by Mr. MURRAY ADAMS-ACTON.

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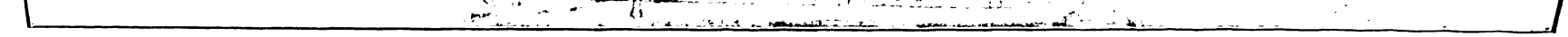

Le Matherin, St. Omer.

Church of Holy St. Leu.
North Porch, Cathedral, St. Omer.

South Porch, Cathedral, St. Omer.

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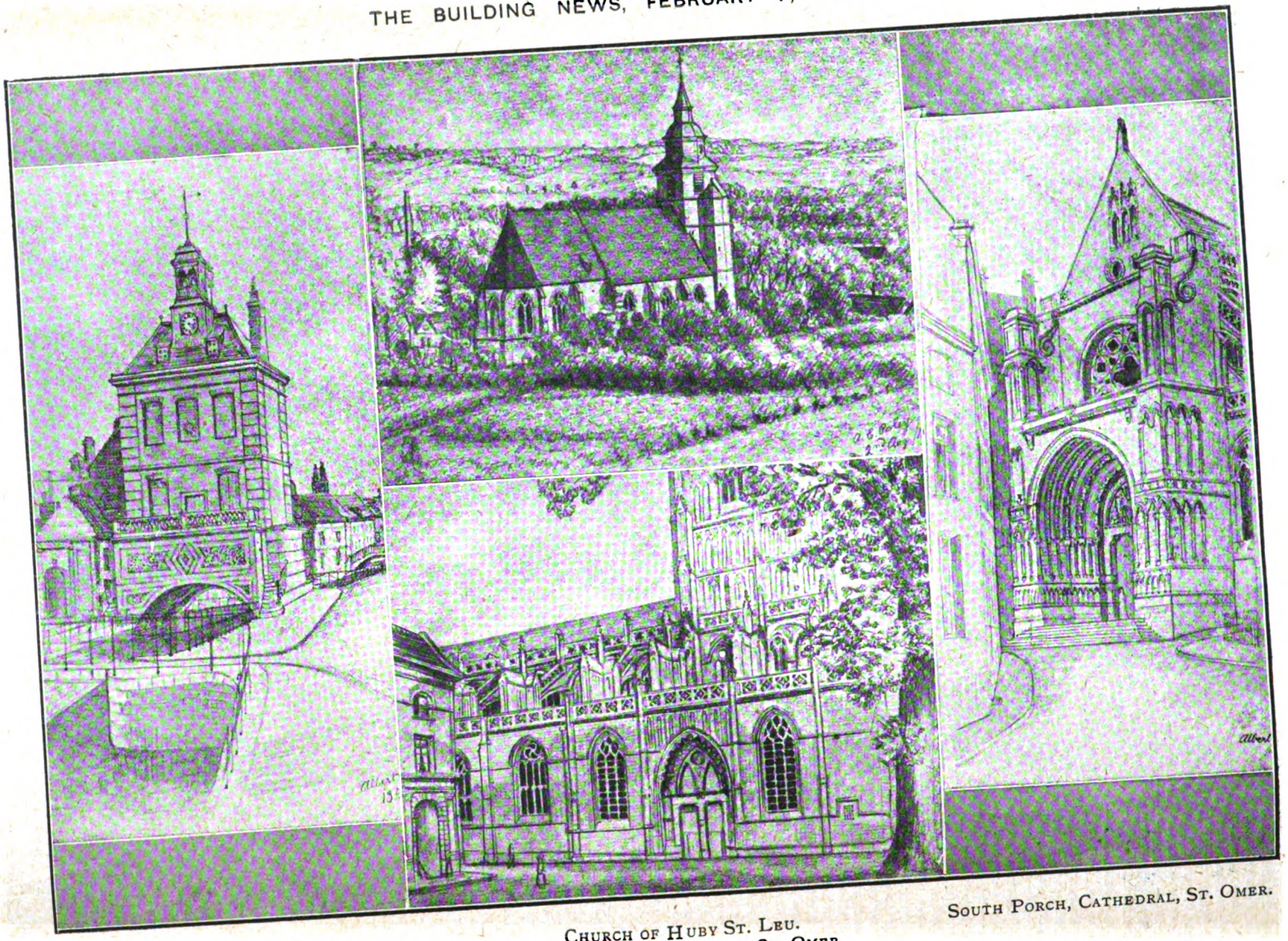

LE MATHERIN, ST. OMER.

CHURCH OF HUBY ST. LEU.
NORTH PORCH, CATHEDRAL, ST. OMER.

SOUTH PORCH, CATHEDRAL, ST. OMER.

G.H.Q. TROOPS' EXHIBITION OF ART.—GRAND PRIX DIPLOMA SKETCHES IN FRANCE.

By Lance-Corp. A. E. POLEY, Silver Medallist R.I.B.A.

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Our Illustrations.

AN ENTRANCE HALL WITH FURNITURE.

This spirited and suggestive interior water-colour drawing shows a newly built and marble-paved entrance hall, designed by Mr. Murray Adams-Acton, of St. John's Wood, who is now from home on military service with the Scots Guards. The work represented is harmoniously arranged in a homely manner without undue elaboration, the furnishings in keeping being relied on as part of a reserved tasteful piece of English design carried out on historic lines of decoration. The original tinted picture from which our double-page was reproduced, is a capital example of this artist's facility of draughtsmanship and accuracy of perspective, giving relative values in an effective and ready fashion.

MORNINGSIDE BRANCH LIBRARY, EDINBURGH.

This branch library for the district of Morningside was erected some little time ago by the Edinburgh Library Committee. It is built of stone with ashlar from Blackpastures, Northumberland. The library consists of a lending department and reading-room. The latter is a spacious apartment, square on plan and surmounted centrally by a deeply coffered dome, certain of the panels being glazed with ground and figured glass. The plaster work and modelling was well carried out by Messrs. Mackenzie, of Glasgow. The stone carving was executed by the late Mr. Joseph Hayes, an able artist who has lost his life while on active service in the Black Watch. The roof of the front building is slated with large-sized Tilberthwaite slates. The cost of the building was about £5,000, and was designed by the architect to the Corporation, Mr. James A. Williamson, A.R.I.B.A. The plans, with the detail of the façade, reproduced by our double-page, show clearly the admirable character of the building.

AN ARCHITECT'S HOUSE—LONG WITTENHAM, NEAR ABINGDON, BERKS.

This brick and tile country house, which Mr. E. Guy Dawber has built, high up on a gravel bank overlooking the Thames near Abingdon, for his own occupation, is surrounded by an extensive garden, of which the four photographs here reproduced give some idea. The lawn, represented by the left-hand lower picture, is enclosed by a terraced walk from whence the river is seen beyond the big elms. The owner's scheme for developing the grounds has had to be laid aside in consequence of the war, but the accompanying page serves to show the natural charm of the environment of his home in Berkshire.

G.H.Q. TROOPS' EXHIBITION GRAND PRIX DIPLOMA SKETCHES IN FRANCE.

We have already given a sheet of Lance-Corporal A. E. Poley's Diploma Prize General Headquarter's sketches in French Flanders, sent us from the Front for publication in THE BUILDING NEWS. Our previous selection of these pocket-book studies appeared in our issue for January 24, when some notes in reference to the subjects illustrated were printed. To-day, as promised, we include a second page, comprising views of the north and south porches of the Cathedral at St. Omer, a picturesque landscape study of the church at Huby St. Leu, and the Dutch-like waterway town of the Matherin at St. Omer.

Rai Bahadur Sarat Chandra Das, C.I.E., the famous Tibetan explorer, died on the 5th ult. at his residence on Devapahar, in Port Carmichael, Chittagong.

Economy of space, says the *City Press*, is certainly not among the principles practised, even if preached, by the War Savings Committee. At the present time the dining-room of the Salisbury Hotel, now the headquarters of the committee, is in the sole possession of one official!

CONCRETE AND REINFORCED CONCRETE.

CHAPTER VII.—(*Continued from page 109.*)

9. COLUMNS.

By columns are meant compression members, of which the ratio of unsupported length to least width exceeds about four, and which are provided with reinforcement of one of the forms hereafter described.

It is recommended that the ratio of unsupported length of column to its least width be limited to 15.

The effective area of hooped columns or columns reinforced with structural shapes shall be taken as the area within the circle enclosing the spiral or the polygon enclosing the structural shapes.

Columns may be reinforced by longitudinal bars; by bands, hoops, or spirals, together with longitudinal bars; or by structural forms which are sufficiently rigid to have value in themselves as columns. The general effect of closely spaced hooping is to greatly increase the toughness of the column and to add to its ultimate strength, but hooping has little effect on its behaviour within the limit of elasticity. It thus renders the concrete a safer and more reliable material, and should permit the use of a somewhat higher working stress. The beneficial effects of toughening are adequately provided by a moderate amount of hooping, a larger amount serving mainly to increase the ultimate strength and the deformation possible before ultimate failure.

Composite columns of structural steel and concrete, in which the steel forms a column by itself, should be designed with caution. To classify this type as a concrete column reinforced with structural steel is hardly permissible, as the steel generally will take the greater part of the load. When this type of column is used, the concrete should not be relied upon to tie the steel units together nor to transmit stresses from one unit to another. The units should be adequately tied together by tie-plates or lattice bars, which, together with other details, such as splices, etc., should be designed in conformity with standard practice for structural steel. The concrete may exert a beneficial effect in restraining the steel from lateral deflection, and also in increasing the carrying capacity of the column. The proportion of load to be carried by the concrete will depend on the form of the column and the method of construction. Generally, for high percentages of steel, the concrete will develop relatively low unit stresses, and caution should be used in placing dependence on the concrete.

The following recommendations are made for the relative working stresses in the concrete for the several types of columns:—

(*a*) Columns with longitudinal reinforcement to the extent of not less than 1 per cent. and not more than 4 per cent., and with lateral ties of not less than ¼ in. in diameter, 12 in. apart, nor more than 16 diameters of the longitudinal bar: the unit stress recommended for axial compression, on concrete piers having a length not more than four diameters, in Chapter VIII., Section 3.

(*b*) Columns reinforced with not less than 1 per cent. and not more than 4 per cent. of longitudinal bars and with circular hoops or spirals not less than 1 per cent. of the volume of the concrete and as hereinafter specified: a unit stress 55 per cent. higher than given for (*a*), provided the ratio of unsupported length of column to diameter of the hooped core is not more than 10.

The foregoing recommendations are based on the following conditions:—

It is recommended that the minimum size of columns to which the working stresses may be applied be 12 in., out to out.

In all cases longitudinal reinforcement is assumed to carry its proportion of stress in accordance with Section 3 (*c*) 6 of this chapter. The hoops or bands are not to be counted on directly as adding to the strength of the column.

Longitudinal reinforcement bars should be maintained straight, and shall have sufficient lateral support to be securely held in place until the concrete has set.

Where hooping is used, the total amount of such reinforcement shall be not less than 1 per cent. of the volume of the column, enclosed. The clear spacing of such hooping shall be not greater than one-sixth the diameter of the enclosed column, and preferably not greater than one-tenth, and in no case more than 2½ in. Hooping is to be circular and the ends of bands must be united in such a way as to develop their full strength. Adequate means must be provided to hold bands or hoops in place so as to form a column, the core of which shall be straight and well centred. The strength of hooped columns depends very much upon the ratio of length to diameter of hooped core, and the strength due to hooping decreases rapidly as this ratio increases beyond five. The working stresses recommended are for hooped columns with a length of not more than ten diameters of the hooped core. The Committee has no recommendation to make for a formula for working stresses for columns longer than ten diameters.

Bending stresses due to eccentric loads, such as unequal spans of beams, and to lateral forces, must be provided for by increasing the section until the maximum stress does not exceed the values above specified. Where tension is possible in the longitudinal bars of the column, adequate connection between the ends of the bars must be provided to take this tension.

10. REINFORCING FOR SHRINKAGE AND TEMPERATE STRESSES.

When areas of concrete too large to expand and contract freely as a whole are exposed to atmospheric conditions, the changes of form due to shrinkage and to action of temperature are such that cracks may occur in the mass unless precautions are taken to distribute the stresses so as to prevent the cracks altogether or to render them very small. The distance apart of the cracks, and consequently their size, will be directly proportional to the diameter of the reinforcement and to the tensile strength of the concrete, and inversely proportional to the percentage of reinforcement, and also to its bond resistance per unit of surface area. To be most effective, therefore, reinforcement (in amount generally not less than one-third of 1 per cent. of the gross area) of a form which will develop a high bond resistance should be placed near the exposed surface and be well distributed. Where openings occur the area of cross-section of the reinforcement should not be reduced. The allowable size and spacing of cracks depends on various considerations, such as the necessity for watertightness, the importance of appearance of the surface, and the atmospheric changes.

The tendency of concrete to shrink makes it necessary, except where expansion is provided for, to thoroughly connect the component parts of the frame of articulated structures, such as floor and wall members in buildings, by the use of suitable reinforcing material. The amount of reinforcement for such connection should bear some relation to the size of the members connected, larger and heavier members requiring stronger connections. The reinforcing bars should be extended beyond the critical section far enough, or should be sufficiently anchored to develop their full tensile strength.

11.—FLAT SLAB.

The continuous flat slab reinforced in two or more directions and built monolithically with the supporting columns (without beams or girders) is a type of construction which is now extensively used and which has recognised advantages for certain types of structures as, for example, warehouses in which large, open floor space is desired. In its construction, there is excellent opportunity for inspecting the position of the reinforcement. The conditions attending depositing and placing of concrete are favourable to securing uniformity and soundness in the concrete. The recommendations in the following paragraphs relate to flat slabs extending over several rows of panels in each direction. Necessarily the treatment is more or less empirical.

The coefficients and moments given relate to uniformly distributed loads.

(*a*) *Column Capital.*—It is usual in flat slab construction to enlarge the supporting

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columns at their top, thus forming column capitals. The size and shape of the column capital affect the strength of the structure in several ways. The moment of the external forces which the slab is called upon to resist is dependent upon the size of the capital; the section of the slab immediately above the upper periphery of the capital carries the highest amount of punching shear; and the bending moment developed in the column by an eccentric or unbalanced loading of the slab is greatest at the under surface of the slab. Generally, the horizontal section of the column capital should be round or square with rounded corners. In oblong panels the section may be oval or oblong, with dimensions proportional to the panel dimensions. For computation purposes, the diameter of the column capital will be considered to be measured where its vertical thickness is at least 1½ in., provided the slope of the capital below this point nowhere makes an angle with the vertical of more than 45 degrees. In case a cap is placed above the column capital, the part of this cap within a cone made by extending the lines of the column capital upward at the slope of 45 deg. to the bottom of the slab or dropped panel may be considered as part of the column capital in determining the diameter for design purposes. Without attempting to limit the size of the column capital for special cases, it is recommended that the diameter of the column capital (or its dimension parallel to the edge of the panel) generally be made not less than one-fifth of the dimension of the panel from centre to centre of adjacent columns. A diameter equal to 0.225 of the panel length has been used quite widely and acceptably. For heavy loads or large panels, especial attention should be given to designing and reinforcing the column capital with respect to compressive stresses and bending moments. In the case of heavy loads or large panels, and where the conditions of the panel loading or variations in panel length or other conditions cause high bending stresses in the column and also for column capitals smaller than the size herein recommended, especial attention should be given to designing and reinforcing the column capital with respect to compression and rigidity of connection to floor-slab.

(*b*) *Dropped Panel.*—In one type of construction the slab is thickened throughout an area surrounding the column capital. The square or oblong of thickened slab thus formed is called a dropped panel or a drop. The thickness and the width of the dropped panel may be governed by the amount of resisting moment to be provided (the compressive stress in the concrete being dependent upon both thickness and width), or its thickness may be governed by the resistance to shear required at the edge of the column capital and its width by the allowable compressive stresses and shearing stresses in the thinner portion of the slab adjacent to the dropped panel. Generally, however, it is recommended that the width of the dropped panel be at least four-tenths of the corresponding side of the panel as measured from centre to centre of columns, and that the offset in thickness be not more than five-tenths of the thickness of the slab outside the dropped panel.

(*c*) *Slab Thickness.*—In the design of a slab, the resistance to bending and to shearing forces will largely govern the thickness, and, in the case of large panels with light loads, resistance to deflection may be a controlling factor. The following formulas for minimum thicknesses are recommended as general rules of design when the diameter of the column capital is not less than one-fifth of the dimension of the panel from centre to centre of adjacent columns, the larger dimension being used in the case of oblong panels. For notation, let

t = total thickness of slab, in inches;
L = panel length, in feet;
w = sum of live load and dead load, in pounds per square foot.

Then, for a slab without dropped panels,

$$\text{minimum } t = 0.024\ L\ \sqrt{w} + 1\tfrac{1}{2};$$

for a slab with dropped panels,

$$\text{minimum } t = 0.02\ L\ \sqrt{w} + 1;$$

for a dropped panel whose width is four-tenths of the panel length,

$$\text{minimum } t = 0.03\ L\ \sqrt{w} + 1\tfrac{1}{2}.$$

In no case should the slab thickness be made less than 6 in., nor should the thickness of a floor-slab be made less than one-thirty-second of the panel length, nor the thickness of a roof slab less than one-fortieth of the panel length.

(*d*) *Bending and Resisting Moments in Slabs.*—If a vertical section of a slab be taken across a panel along a line midway between columns, and if another section be taken along an edge of the panel parallel to the first section, but skirting the part of the periphery of the column capitals at the two corners of the panels, the moment of the

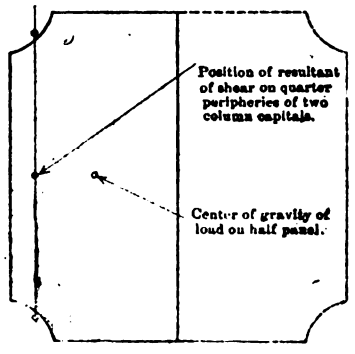

FIG. 1.

couple formed by the external load on the half panel, exclusive of that over the column capital (sum of dead and live loads) and the resultant of the external shear or reaction at the support at the two column capitals (see Fig. 1), may be found by ordinary static analysis. It will be noted that the edges of the area here considered are along lines of zero shear, except around the column capitals. This moment of the external forces acting on the half panel will be resisted by the numerical sum of (*a*) the moment of the internal stresses at the section of the panel midway between columns (positive resisting moment) and (*b*) the moment of the internal stresses at the section referred to at the end of the panel (negative resisting moment). In the curved portion of the end section (that

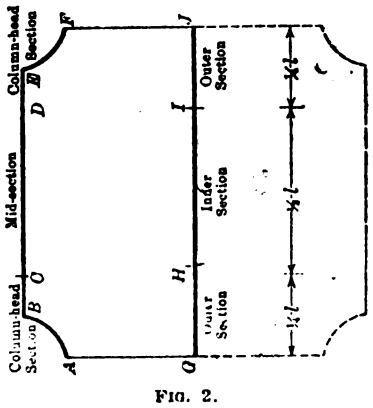

FIG. 2.

skirting the column), the stresses considered are the components which act parallel to the normal stresses on the straight portion of the section. Analysis shows that for a uniformly distributed load, and round columns, and square panels, the numerical sum of the positive moment and the negative moment at the two sections named is given quite closely by the equation:—

$$M_x = \tfrac{1}{8}\ w\ l\ (l - \tfrac{1}{3}\ c)^2.$$

In this formula and in those which follow relating to oblong panels,

w = Sum of the live and dead loads per unit of area;
l = Side of a square panel measured from centre to centre of columns;
l_1 = One side of the oblong panel measured from centre to centre of columns;
l_2 = Other side of oblong panel measured in the same way;
c = Diameter of the column capital;
Mx = Numerical sum of positive moment and negative moment in one direction;
My = Numerical sum of positive moment and negative moment in the other direction.*

For oblong panels, the equation for the numerical sum of the positive moment and the negative moment at the two sections named becomes—

$$M_x = \tfrac{1}{8}\ w\ l_2\ (l_1 - \tfrac{2}{3}\ c)^2$$

$$M_y = \tfrac{1}{8}\ (w\ l_1\ (l_2 - \tfrac{2}{3}c)^2$$

where Mx is the numerical sum of the positive moment and the negative moment for the sections parallel to the dimension l_2, and $M\,y$ is the numerical sum of the positive moment and the negative moment for the sections parallel to the dimension l_1.

What proportion of the total resistance exists as positive moment and what as negative moment is not readily determined. The amount of the positive moment and that of the negative moment may be expected to vary somewhat with the design of the slab. It seems proper, however, to make the division of total resisting moment in the ratio of three-eighths for the positive moment to five-eighth for the negative moment.

With reference to variations in stress along the sections, it is evident from conditions of flexure that the resisting moment is not distributed uniformly along either the section of positive moment or that of negative moment. As the law of the distribution is not known definitely, it will be necessary to make an empirical apportionment along the sections; and it will be considered sufficiently accurate generally to divide the sections into two parts, and to use an average value over each part of the panel section.

The relatively large breadth of structure in a flat slab makes the effect of local variations in the concrete less than would be the case for narrow members like beams. The tensile resistance of the concrete is less affected by cracks. Measurements of deformations in buildings under heavy load indicate the presence of considerable tensile resistance in the concrete, and the presence of this tensile resistance acts to decrease the intensity of the compressive stresses. It is believed that the use of moment coefficients somewhat less than those given in a preceding paragraph, as derived by analysis, is warranted, the calculations of resisting moment and stresses in concrete and reinforcement being made according to the assumptions specified in this report, and no change being made in the values of the working stresses ordinarily used. Accordingly, the values of the moments which are recommended for use are somewhat less than those derived by analysis. The values given may be used when the column capitals are round, oval, square, or oblong.

(*e*) *Names for Moment Sections.*—For convenience, that portion of the section across a panel along a line midway between columns which lies within the middle two quarters of the width of the panel (H I, Fig. 2) will be called the inner section, and that portion in the two outer quarters of the width of the panel (G H and I J, Fig. 2) will be called the outer sections. Of the section which follows a panel edge from column capital to column capital, and which includes the quarter peripheries of the edges of two column capitals, that portion within the middle two quarters of the panel width (C D, Fig. 2) will be called the mid-section, and the two remaining portions (A B C and D E F, Fig. 2), each having a projected width equal to one-fourth of the panel width, will be called the column-head sections.

(*f*) *Positive Moment.*—For a square interior panel, it is recommended that the positive moment for a section in the middle of a panel extending across its width be taken as $\frac{1}{25}\ w\ l\left(l - \frac{2}{3}\ c\right)^2$. Of this moment, at least 25 per cent. should be pro-

* See paper and closure "Statical Limitations upon the Steel Requirement in Reinforced Concrete Flat Slab Floors," by John R. Nichols, Jun. Am. Soc. C.E., *Transactions* Am. Soc. C.E., Vol. LXXVII.

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vided for in the inner section; in the two outer sections of the panel at least 55 per cent. of the specified moment should be provided for in slabs not having dropped panels, and at least 60 per cent. in slabs having dropped panels, except that in calculations to determine necessary thickness of slab away from the dropped panel at least 70 per cent. of the positive moment should be considered as acting in the two outer sections.

(*g*) *Negative Moment.*—For a square interior panel, it is recommended that the negative moment for a section which follows a panel edge from column capital to column capital, and which includes the quarter peripheries of the edges of the two column capitals (the section altogether forming the projected width of the panel) be taken as $\frac{1}{15} w l \left(l - \frac{2}{3} c\right)^2$. Of this negative moment, at least 20 per cent. should be provided for in the mid-section, and at least 65 per cent. in the two column-head sections of the panel, except that in slabs having dropped panels at least 80 per cent. of the specified negative should be provided for in the two column-head sections of the panel.

(*h*) *Moments for Oblong Panels.*—When the length of a panel does not exceed the breadth by more than 5 per cent., computation may be made on the basis of a square panel with sides equal to the mean of the length and the breadth.

When the long side of an interior oblong panel exceeds the short side by more than one-twentieth and by not more than one-third of the short side, it is recommended that the positive moment be taken as $\frac{1}{25} w l_2 \left(l_1 - \frac{2}{3} c\right)^2$ on a section parallel to the dimension, l_2, and $\frac{1}{25} w l_1 \left(l_2 - \frac{2}{3} c\right)^2$ on a section parallel to the dimension, l_1; and that the negative moment be taken as $\frac{1}{15} w l_2 \left(l_1 - \frac{2}{3} c\right)^2$ on a section at the edge of the panel corresponding to the dimension, l_2, and $\frac{1}{15} w l_1 \left(l_2 - \frac{2}{3} c\right)$ at a section in the other direction. The limitations of the apportionment of moment between inner section and outer section and between mid-section and column-head sections may be the same as for square panels.

(*i*) *Wall Panels.*—The coefficient of negative moment at the first row of columns away from the wall should be increased 20 per cent. over that required for interior panels, and likewise the coefficient of positive moment at the section half way to the wall should be increased by 20 per cent. If girders are not provided along the wall, or the slab does not project as a cantilever beyond the column line, the reinforcement parallel to the wall for the negative moment in the column-head section and for the positive moment in the outer section should be increased by 20 per cent. If the wall is carried by the slab, this concentrated load should be provided for in the design of the slab. The coefficient of negative moments at the wall to take bending in the direction perpendicular to the wall line may be determined by the conditions of restraint and fixedness, as found from the relative stiffness of columns and slab, but in no case should it be taken as less than one-half of that for interior panels.

(*j*) *Reinforcement.*—In the calculation of moments, all the reinforcing bars which cross the section under consideration, and which may fulfil the requirements given under Paragraph (*l*) of this chapter, may be used. For a column-head section, reinforcing bars parallel to the straight portion of the section do not contribute to the negative resisting moment for the column-head in question. In the case of four-way reinforcement, the sectional area of the diagonal bars, multiplied by the sine of the angle between the diagonal of the panel and the straight portion of the section under consideration, may be taken to act as reinforcement in a rectangular direction.

(*k*) *Point of Inflection.*—For the purpose of making calculations of moments at sections away from the sections of negative moment and positive moment already specified, the point of inflection on any line parallel to a panel edge may be taken as one-fifth of the clear distance on that line between the two sections of negative moment at the opposite ends of the panel indicated in Paragraph (*e*) of this chapter. For slabs having dropped panels, the co-efficient of one-fourth should be used instead of one-fifth.

(*l*) *Arrangement of Reinforcement.*—The design should include adequate provision for securing the reinforcement in place, so as to take not only the maximum moments, but the moments at intermediate sections. All bars in rectangular bands or diagonal bands should extend on each side of a section of maximum moment, either positive or negative, to points at least 20 diameters beyond the point of inflection, as defined herein, or be hooked or anchored at the point of inflection. In addition to this provision, bars in diagonal bands used as reinforcement for negative moment should extend on each side of a line drawn through the column centre at right angles to the direction of the band at least a distance equal to thirty-five one-hundredths of the panel length, and bars in diagonal bands used as reinforcement for positive moment should extend on each side of a diagonal through the centre of the panel at least a distance equal to thirty-five one-hundredths of the panel length; and no splice by lapping should be permitted at or near regions of maximum stress, except as just described. Continuity of reinforcing bars is considered to have advantages, and it is recommended that not more than one-third of the reinforcing bars in any direction be made of a length less than the distance centre to centre of columns in that direction. Continuous bars should not all be bent up at the same point of their length, but the zone in which this bending occurs should extend on each side of the assumed point of inflection, and should cover a width of at least one-fifteenth of the panel length. Mere draping of the bars should not be permitted. In four-way reinforcement, the position of the bars in both diagonal and rectangular directions may be considered in determining whether the width of zone of bending is sufficient.

(*m*) *Reinforcement at Construction Joints.*—It is recommended that at construction joints extra reinforcing bars equal in section to 20 per cent. of the amount necessary to meet the requirements for moments at the section where the joint is made be added to the reinforcement, these bars to extend not less than 50 diameters beyond the joint on each side.

(*n*) *Tensile and Compressive Stresses.*—The usual method of calculating the tensile and compressive stresses in the concrete and in the reinforcement, based on the assumptions for internal stresses given in this chapter, should be followed. In the case of the dropped panel, the section of the slab and dropped panel may be considered to act integrally for a width equal to the width of the column-head section.

(*o*) *Provision for Diagonal Tension and Shear.*—In calculations for the shearing stress which is to be used as the means of measuring the resistance to diagonal tension stress, it is recommended that the total vertical shear on two column-head sections constituting a width equal to one-half the lateral dimension of the panel, for use in the formula for determining critical shearing stresses, be considered to be one-fourth of the total dead and live loads on a panel for a slab of uniform thickness, and to be three-tenths of the sum of the dead and live loads on a panel for a slab with dropped panels. The formula for shearing unit stress given in the Appendix to this report may then be written $v = \frac{0{\cdot}25\ W}{bjd}$ for slabs of uniform thickness, and $v = \frac{0.30\ W}{bjd}$ for slabs with dropped panels, where W is the sum of the dead and live loads on a panel, b is half the lateral dimension of the panel measured from centre to centre of columns, and jd is the lever arm of the resisting couple at the section.

The calculation of what is commonly called punching shear may be made on the assumption of a uniform distribution over the section of the slab around the periphery of the column capital, and also of a uniform distribution over the section of the slab around the periphery of the dropped panel, using in each case an amount of vertical shear greater by 25 per cent. than the total vertical shear on the section under consideration.

The values of working stresses should be those recommended for diagonal tension and shear in Chapter VIII., Section 5.

(*p*) *Walls and Openings.*—Girders or beams should be constructed to carry walls and other concentrated loads which are in excess of the working capacity of the slab. Beams should also be provided in case openings in the floor reduce the working strength of the slab below the required carrying capacity.

(*q*) *Unusual Panels.*—The coefficients, apportionments, and thicknesses recommended are for slabs which have several rows of panels in each direction, and in which the size of the panels is approximately the same. For structures having a width of one, two or three panels, and also for slabs having panels of markedly different sizes, an analysis should be made of the moments developed in both slab and columns, and the values given herein modified accordingly. Slabs with panelled ceiling or with depressed panelling in the floor are to be considered as coming under the recommendations herein given.

(*r*) *Bending Moments in Columns.*—Provision should be made in both wall columns and interior columns for the bending moment which will be developed by unequally loaded panels, eccentric loading, or uneven spacing of columns. The amount of moment to be taken by a column will depend upon the relative stiffness of columns and slab, and computations may be made by rational methods, such as the principle of least work, or of slope and deflection. Generally, the larger part of the unequalised negative moment will be transmitted to the columns, and the column should be designed to resist this bending moment. Especial attention should be given to wall columns and corner columns.

CHAPTER VIII.

WORKING STRESSES.

1. GENERAL ASSUMPTIONS.

The following working stresses are recommended for static loads. Proper allowances for vibration and impact are to be added to live loads where necessary to produce an equivalent static load before applying the unit stresses in proportioning parts.

In selecting the permissible working stress on concrete, the designer should be guided by the working stresses usually allowed for other materials of construction, so that all structures of the same class composed of difference materials may have approximately the same degree of safety.

The following recommendations as to allowable stresses are given in the form of percentages of the ultimate strength of the particular concrete which is to be used; this ultimate strength is that developed at an age of 28 days, in cylinders 8 ins. in diameter and 16 ins. long, of the consistency described in Chapter IV., Section 2 (*d*), made and stored under laboratory conditions. In the absence of definite knowledge in advance of construction as to just what strength may be expected, the Committee submits the following values as those which should be obtained with materials and workmanship in accordance with the recommendations of this report.

Although occasional tests may show higher results than those here given, the Committee recommends that these values should be the maximum used in design.

TABLE OF COMPRESSIVE STRENGTHS OF DIFFERENT MIXTURES OF CONCRETE.

In pounds per square inch.

Aggregate.	1 : 3*	1 : 4½*	1 : 6*	1 : 7½*	1 : 9*
Granite, trap rock	3,300	2,800	2,200	1,800	1,400
Gravel, hard limestone and hard sandstone.	3,000	2,500	2,000	1,600	1,300
Soft limestone and sandstone	2,200	1,800	1,500	1,200	1,000
Cinders	800	700	600	500	400

Note.—For variations in the moduli of elasticity see Chapter VIII., Section 8.

* Combined volume fine and coarse aggregate measured separately.

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2. BEARING.

When compression is applied to a surface of concrete of at least twice the loaded area, a stress of 35 per cent. of the compressive strength may be allowed in the area actually under load.

3. AXIAL COMPRESSION.

For concentric compression on a plain concrete pier, the length of which does not exceed four diameters, or on a column reinforced with longitudinal bars only, the length of which does not exceed twelve diameters, 22.5 per cent. of the compressive strength may be allowed.

For other forms of columns, the stresses obtained from the ratios given in Chapter VII., Section 9, may govern.

4. COMPRESSION IN EXTREME FIBRE.

The extreme fibre stress of a beam, calculated on the assumption of a constant modulus of elasticity for concrete under working stresses may be allowed to reach 32.5 per cent. of the compressive strength. Adjacent to the support of continuous beams, stresses 15 per cent. higher may be used.

5. SHEAR AND DIAGONAL TENSION.

In calculations on beams in which the maximum shearing stress in a section is used as the means of measuring the resistance to diagonal tension stress, the following allowable values for the maximum vertical shearing stress in concrete, calculated by the method given in the Appendix, Formula 22, are recommended :

(a) For beams with horizontal bars only and without web reinforcement, 2 per cent. of the compressive strength.

(b) For beams with web reinforcement consisting of vertical stirrups looped about the longitudinal reinforcing bars in the tension side of the beam and spaced horizontally not more than one-half the depth of the beam or for beams in which longitudinal bars are bent up at an angle of not more than 45 degrees or less than 20 degrees with the axis of the beam, and the points of bending are spaced horizontally not more than three-quarters of the depth of the beam apart, not to exceed 4½ per cent of the compressive strength.

(c) For a combination of bent bars and vertical stirrups looped about the reinforcing bars in the tension side of the beam and spaced horizontally not more than one-half of the depth of the beam, 5 per cent of the compressive strength.

(d) For beams with web reinforcement (either vertical or inclined) securely attached to the longitudinal bars in the tension side of the beam in the case of inclined members, slipping of bar past the stirrup, and spaced horizontally not more than one-half of the depth of the beam in case of vertical stirrups and not more than three-fourths of the depth of the beam in the case of inclined members, either with longitudinal bars bent up or not, 6 per cent. of the compressive strength.

The web reinforcement in case any is used should be proportioned by using two-thirds of the external vertical shear in Formulas 24 or 25 in Chapter X. The effect of longitudinal bars bent up at an angle of from 20 to 45° with the axis of the beam, may be taken at sections of the beam in which the bent up bars contribute to diagonal tension resistance, as defined under Chapter VII., Section 8, as reducing the shearing stresses to be otherwise provided for. The amount of reduction of the shearing stress by means of bent up bars will depend upon their capacity, but in no case should be taken as greater than 4½ per cent. of the compressive strength of the concrete over the effective cross-section of the beam (Formula 22). The limit of tensile stress in the bent up portion of the bar calculated by Formula 25, using in this formula an amount of total shear corresponding to the reduction in shearing stress assumed for the bent up bars, may be taken as specified for the working stress of steel, but in the calculations the stress in the bar due to its part as longitudinal reinforcement of the beam should be considered. The stresses in stirrups and inclined members when combined with bent up bars are to be determined by finding the amount of the total shear which may be allowed by reason of the bent up bars, and subtracting this shear from the total external vertical shear. Two-thirds of the remainder will be the shear to be carried by the stirrups, using Formulas 24 or 25 in the Appendix.

Where punching shear occurs, provided the diagonal tension requirements are met, a shearing stress of 6 per cent. of the compressive strength may be allowed.

6. BOND.

The bond stress between concrete and plain reinforcing bars may be assumed at 4 per cent. of the compressive strength, or 2 per cent. in the case of drawn wire. In the best types of deformed bar, the bond stress may be increased, but not to exceed 5 per cent. of the compressive strength of the concrete.

7. REINFORCEMENT.

The tensile or compressive stress in steel should not exceed 16,000 lb. per sq. in.

In structural steel members, the working stresses adopted by the American Railway Engineering Association are recommended.

8. MODULUS OF ELASTICITY.

The value of the modulus of elasticity of concrete has a wide range, depending on the materials used, the age, the range of stresses between which it is considered, as well as other conditions. It is recommended that, in computations for the position of the neutral axis, and for the resisting moment of beams, and for compression of concrete in columns, it be assumed as :—

(*a*) One-fortieth that of steel, when the strength of the concrete is taken as not more than 800 lb. per sq. in.

(*b*) One-fifteenth that of steel, when the strength of the concrete is taken as greater than 800 lb. per sq. in. and less than 2,200 lb. per sq. in.

(*c*) One-twelfth that of steel, when the strength of the concrete is taken as greater than 2,200 lb. per sq. in. and less than 2,900 lb. per sq. in., and

(*d*) One-tenth that of steel, when the strength of the concrete is taken as greater than 2,900 lb. per sq. in.

Although not rigorously accurate, these assumptions will give safe results. For the deflection of beams which are free to move longitudinally at the supports, in using formulas for deflection which do not take into account the tensile strength developed in the concrete, a modulus of one-eighth of that of steel is recommended.

(To be concluded.)

STATUES AND MEMORIALS.

MEMORIALS TO MANCHESTER OFFICERS.—At Chester Consistory Court a number of faculties have been decreed for the erection of memorials to officers who have fallen in the war. Memorials are to be erected in St. Catherine's Church, Birtles, in memory of Lieutenant J. C. Close-Brooks, 1st Life Guards, who was killed in action on October 30 last; in Bebington Parish Church in memory of Second Lieutenant R. P. Scholefield, Cheshire Regiment, killed on July 25 last; in Timperley Parish Church in memory of Captain K. C. G. Wray, South Lancashire Regiment, killed on August 9 last; in St. Mark's, New Ferry, in memory of Captain G. B. Sayce, 20th Battalion Manchester Regiment, killed on July 1 last; in St. George's, Hyde, in memory of Second Lieutenant E. W. Westbrook, 8th Battalion Manchester Regiment, killed on November 8, 1915; and in St. Mark's, Saltney, in memory of Second Lieutenant Alan Sheriff Roberts, 14th Battalion Royal Welsh Fusiliers.

TRADE NOTES.

Boyle's latest patent "air-pump" ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, E.C., have been employed by the Consett Iron Co. for Bradley shops extensions, Consett.

In these days of strict economy a surprisingly large amount of waste results from foodstuffs and other materials being stored in damp cellars. The difficulty is easily overcome by the use of a waterproofed cement rendering. We are informed that the cellars of a mansion at Rochampton were very damp and the above treatment was successfully applied, the powder "Pudlo" being adopted for the work.

Correspondence.

AUSTRALIAN PARLIAMENT HOUSE ARCHITECTURAL COMPETITION.

To the Editor of THE BUILDING NEWS.

SIR,—I have to inform you that the Government, installed November 14, 1916, has now, because of war conditions, indefinitely postponed the reception of designs in the Federal Parliament House Architectural Competition.

The Minister has arranged for the registration of competitors to be retained, and states that it is intended to complete the adopted programme as soon as the time is opportune.

—Yours, etc.,

FEDERAL CAPITAL DIRECTOR OF DESIGN AND CONSTRUCTION.

Federal Capital Office, 84, William Street, Melbourne, December 13, 1916.

OBITUARY.

Mr. E. H. Lingen Barker (of the firm of Lingen Barker and Anthony Barker) passed away at his residence in London on January 27, at the age of 78, as we briefly announced last week just as we went to press. Mr. Barker built and restored a very large number of churches in different parts of England and Wales, and latterly has identified himself with a movement for the erection of churches to meet the needs of the growing populations in our large industrial centres. An important step in the progress of the movement was taken in February, 1907, when Sir W. H. Houldsworth, Bart., at a meeting of the Bishop of Manchester's Commission at Manchester, pleaded for the careful consideration of the cost of the churches, which were to be built with the help of money granted by the Commission, and strongly urged the building of a church at a cost of £8 a sitting. Mr. Barker was forthwith commissioned to prepare plans for various churches in the Manchester Diocese. He also had considerable school practice, and held the appointment of architect to ten school boards. Mr. Barker was a member of sundry archæological societies, and the author of several architectural essays, one of them being on Garway Church and the Knights Templars, which he read before the British Archæological Association at their Great Malvern meeting, and another on the Domestic Mediæval Architecture of Herefordshire, for the old Hereford Literary, Philosophical and Natural History Society. He was the author of "Parish Churches of the Diocese of St. David's" and "Warwickshire Parish Churches," the latter being intended by the then Bishop of Worcester, Dr. Philpott, to form the first part of a Diocesan handbook.

The funeral of Mr. Joseph Foster Wood, a well-known Bristol architect, who passed away on January 26, in his 62nd year, at his residence, 9, Westbury Park, took place on January 31, at Canford Cemetery, Westbury-on-Trym. The principal mourners were Miss Marion Wood (sister), the Rev. E. J. D. Hellier (cousin), Mr. John Griffin (brother-in-law), and Mr. Graham C. Awdry, with whom the deceased gentleman was in partnership. Mr. Wood was a former president of the Bristol Society of Architects, who were represented at his funeral. The attendance included Messrs. W. V. Gough, C. F. W. Dening, J. B. Wills, T. Edwards, George Bunyon, Arthur N. Price, and E. W. Beesley (a member of the office staff). Sir Frank Wills was unavoidably absent.

The death is announced, on January 31, at Satwell, Henley-on-Thames, of Mr. Lisle March-Phillipps, whose writings on architecture have in the recent past attracted some notice. The deceased, who was 57 years of age, belonged to the family of March-Phillipps de Lisle, of Garendon and Grace Dieu, and was the son of Spencer March-Phillipps, an Edinburgh reviewer and writer on international law, and grandson of the Right Hon. Samuel March-Phillipps. In 1902 he married Isabel, daughter of Mr. H. Coulson, by whom he had three children. His sister, Miss Evelyn March-Phillipps, died in October, 1915.

Building Intelligence.

DUBLIN.—One of the first buildings to be re-erected in the devastated area of Dublin is that of Messrs. Corrigan and Wilson, printers, of Sackville Place. The space occupied by the building covers an area of some 1,500 superficial feet, and contains three floors. The basement, which is laid with concrete, contains the new machinery. The floor over is carried on steel beams and stanchions and surrounded by a gallery, and the upper floor is carried out in a similar manner. The entire floors are lighted by a large A-shape roof light. Messrs. Farmer Brothers, Nottingham Street, are the contractors. Mr. George B. Beckett, C.E., Stephen's Green, is the architect.

LEGAL INTELLIGENCE.

LIGHT AND AIR DISPUTE.—BEDDINGTON AND OTHERS v. WILLMOTT AND SONS AND ANOTHER.—This was an action, tried on January 31, before Mr. Justice Bailhache and a special jury, by the trustees of the late Mr. Moses, deceased, the owner of 7, Great St. Andrew Street, Shaftesbury Avenue, London, against Messrs. J. Willmott and Sons, builders, and Thomas Gordon, London, Ltd., of 63A, Vincent Street, Glasgow, claiming an injunction and for damages by reason of the interference of the plaintiffs' ancient lights by the erection of a building opposite by Messrs. Willmott for Messrs. Gordon, Ltd. Mr. Kirby, K.C., and Mr. E. G. Palmer appeared for the plaintiffs, and Mr. Compston, K.C., Mr. Maddocks, and Mr. Robertson for the defendants. Plaintiffs, who are freeholders of premises opposite the building erected by the defendants, the Shaftesbury Hotel, complained that the defendants had raised the height of the Shaftesbury Hotel from 46 ft. 6 ins. to 67 ft. 3 ins., with the result that the light coming to the basement, shop, passage, staircase, and front room on the first floor, used for residential purposes, was obstructed, diminished, and interfered with the ordinary comfort and user of the premises.—Mr. C. S. Joseph, of Messrs. C. S. and E. M. Joseph, architects and surveyors, of 83, Queen Street, E.C., gave evidence that there was material diminution of light to the premises. He estimated the loss in letting value at £25 a year. The loss on the site value on the 5 per cent. table he put at £375, or £262 if the lease ran to 1929. On the 6 per cent. table the amount would be £192. In his opinion the premises were worth more than £100 a year before the defendants' buildings were raised.—Mr. H. A. Furber, of Messrs. Furber, 3, Warwick Court, Gray's Inn, auctioneers and surveyors, agreed with the evidence of Mr. Joseph, and supported his figures.—Mr. Wm. Woodward, senior partner of Messrs. W. Woodward and Sons, architects and surveyors, of Southampton Street, Strand, W.C., said in his opinion there was a material diminution of light to the plaintiffs' premises by reason of the building opposite. The street was 36 ft. wide, building to building. The height to the parapet of the old building (excluding the roof) was 32 ft., and that of the new building to the parapet 59 ft. 6 ins., a difference of 27 ft. 6 ins. Taking these figures into consideration, he was of opinion that his conclusion as to the loss of light was indisputable. He put the loss of rent at £30 a year.—Mr. Compston, for the defendants, Messrs. Willmott, said this was an utterly exaggerated claim. His clients did not dispute that there was a loss of light, but his case was that the loss was not such as to justify large damages.—Mr. W. M. Matts, an architect and surveyor, of Staple House, Chancery Lane, W.C., examined, said he had known the district before the erection of the Shaftesbury Hotel. He was the architect for the erection of the hotel at a cost of £23,000. In his opinion the plaintiffs had a sufficient amount of light left to their premises, notwithstanding the erection of the extension of the hotel.—Mr. B. I. Breach, surveyor and estate agent, and a member of the firm of Messrs. Farebrother, Ellis, and Co., of 29, Fleet Street, E.C., gave evidence to the effect that by reason of the erection of the defendants' building the letting or selling value of the plaintiffs' premises had not depreciated, but, in fact, had appreciated in value.—Mr. H. Bloss Taylor, surveyor, of Messrs. Browett and Taylor, 9, Warwick Court, W.C., also gave similar evidence.—The jury returned a verdict for the plaintiffs, and assessed the damages at £150. His lordship entered judgment accordingly against both defendants, with costs.

COMPETITION.

DUBLIN.—The adjudicators' report on the designs submitted in the competition for a town plan of Dublin have at length been made public. The competition owed its inception to the Marquis of Aberdeen, then Lord Lieutenant of Ireland, who offered a prize of £500 for the best plan. The adjudicators were Professor Geddes, Edinburgh; Mr. C. J. MacCarthy, city architect, Dublin; and Mr. C. J. Nolen, M.A., Cambridge, Mass., U.S.A., an expert on town planning. The adjudicators unanimously awarded the premium to the design G, submitted by Professor P. Abercrombie and Messrs. S. J. Kelly and A. J. Kelly, of Liverpool. Honourable mention was also made of the designs F, C, B, and H, of Messrs. J. M. L. Bogle, A. W. Panton, H. O. Burroughs, and Newbold, of Liverpool; Messrs. Kaye Parry and Ross, Dublin; Mr. F. A. Cushing Smith, Urbana, Illinois, U.S.A., and Messrs. Ashbee and Chettle, London, respectively. The Architectural Association has been able to arrange an exhibition of the competitive designs at the A.A.I. rooms in South Frederick Lane, for a short period.

PROFESSIONAL AND TRADE SOCIETIES.

GLASGOW MASTER MASONS' ASSOCIATION.—Topics discussed last week by the Glasgow Master Masons and Bricklayers at their annual meeting in the Building Trades' Exchange, Buchanan Street, included the handicap of private enterprise through taxation and the question of prohibition during the war. Mr. John Train presided. Mr. J. Scott Inglis was elected president for the ensuing year, and Mr. E. Forrest was elected vice-president. Mr. Forrest moved a recommendation of the Committee to the effect that the Association communicate with the other building trades in Glasgow and the West of Scotland, and also the Scottish National Building Trades Federation, with a view to a joint communication being sent to the Secretary for Scotland urging prohibition during the war in the interests of the nation. Mr. William Taylor seconded. Mr. Train moved that they take no action. Mr. William Muir seconded the amendment. The motion was carried by seventeen votes, against three for the amendment.

AN ANALYSIS OF MEDIÆVAL CONSTRUCTION.—At a meeting on January 26, 1917, of the Royal Technical College Architectural Craftsmen's Society, Glasgow, held in the College buildings, Mr. James S. Boyd, Lic. R.I.B.A., lecturer in the architecture and building department of the college, gave a lecture entitled "An Analysis of Mediæval Construction." The lecture was illustrated by a series of slides made by the lecturer from photographs. Mr. Boyd dealt first with walls and foundations, describing the construction and materials used. He then passed on to the construction of piers, pier arcades, vaults of the various types from Romanesque down to the fan vaulting of Henry VII.'s Chapel at Westminster. In dealing with late vaulting, the lecturer stated that "tiercerons" or intermediate ribs were essential in the English system of vaulting, which was not commonly "domical." Just as the transitional builders employed ribs to give additional support to their vaults, so in later work the English Gothic builders used tiercerons to give additional permanent support to the infilling of the vault cells, making it possible to use much lighter masonry. There is a freedom and variety in English vaulting which was unequalled in France, where, after the erection of Amiens, the development of Gothic vaulting practically came to a standstill. Moreover, the use of tiercerons showed the great advance made by English workmen over their contemporaries, culminating in the high-watermark of craftsmanship in the later liern and fan vaulting. Following the vaulting, there was described the abutment system, the construction of doorways, windows, roofs, towers, and spires. Mr. Thomas Whyte, F.S.S., presided, and a vote of thanks to Mr. Boyd was accorded on the motion of Mr. C. Ernest Monro, A.R.I.B.A.

Our Office Table.

Among the many stories told about Lord Cromer the following, related by the London Correspondent is one of the best: The bitterness of his duel with the cunning and unscrupulous Abbas II. was greatly eased by his appreciation of Abbas's humour. He often used to relate how Abbas complained that some of the Italian masons employed on the Assuan dam were Anarchists, and had probably come to the country with the ulterior intention of murdering the Khedive! "But," said Lord Cromer, "if the Anarchists assassinate anyone they are just as likely to kill me as you!" The suggestion pleased Abbas. "Tiens, c'est vrai!" he exclaimed joyously. And Abbas's pleasure delighted Lord Cromer. The Khedive knew other moods, and once remonstrated with Lord Cromer for having a step on his carriage. The fearless Lord Cromer innocently asked why he should not have a step. "Assassins always attack from the step," was the answer.

A master plumber, named Barker, claimed exemption for four men at the London City Local Tribunal last week, and admitted that one of them was aged 21 and passed for general service. He said that he paid his men the standard wages of 10½d. per hour. Captain Elliott said that the current rate was 1s. 1d. Mr. Barker said that it was a rule of the jobbing trade that where a man had a permanent job he had less than a casual one. The Chairman disputed that. Mr. Barker declined to enter into any arrangement with the military authorities, and the Tribunal ordered that three men should serve at once and one should have two months' exemption. Mr. Barker: "That means that I must close up my shop. Is not a plumber engaged in work of national importance?" The Chairman: "That depends upon the state of the market." Mr. Barker: "The state of the market is that men are not obtainable."

"Lockwood's Builders' and Contractors' Price Book" for 1917 (London: Crosby Lockwood and Co., 4s.) is, as usual, a comprehensive handbook of latest prices—so far, of course, as is pointed out in the preface, as any such list can be relied on for more than a few days. For this and other reasons, as the Editor remarks, trade is stagnant, and is likely to remain so till the war is over and we get a Government alive to the absolute necessity of repealing the irksome restrictions and foolish finance which have paralysed our industries since 1909.

Twenty new members have joined the Bribery and Secret Commissions Prevention League, Incorporated, within the last month. They include Lord Blyth, who has become a Vice-President, the Hon. J. G. Jenkins, Mr. H. L. Symonds, and Mr. H. F. Tomalin (the last two the Executive Committee also), and also Mr. T. E. Lescher and Mr. G. Marlow Reed, representing on the council respectively the Drug Club and the Builders' Merchants' Alliance, which have become affiliated to the League. The other new members are: Major G. O. Boase, R.A.; Mr. Edward Hepburn, Dartford; Mr. W. A. Barton Kent, and Mr. J. C. Umney; and Messrs. Barratt and Co., William Cooper and Nephews, Gillespie Brothers and Co., Hall and Co., Croydon, Ltd., Jeyes' Sanitary Compounds Co., Ltd., John Knight, Ltd., James Pascall, Ltd., E. and T. Pink, Ltd., James Robertson and Sons, Preserve Manufacturers, Ltd., Sir B. Samuelson and Co., Ltd. Mr. G. H. Longman has been elected Vice-Chairman of the Executive Committee, of which Mr. Stanley Machin is Chairman.

According to *The London and China Telegraph* the native houses in China are all frame. The uprights are usually native round fir poles, 6 to 8 in. in diameter at the base. Divisions between houses are of 3 in. brick. Joists carrying the floor and roof are round fir poles. The flooring is pine, lap-jointed or tongued-and-grooved. Doors are of pine, made up of thin boards nailed to a frame. Windows are glazed with fourth-quality glass. No hardware is used. Iron-

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work entering into the construction consists only of rainpipes from the roof and nails for the flooring. The walls of foreign residences, shops, etc., are generally of solid brick; fronts are sometimes constructed of granite, stone, or artificial stone. Timber is invariably Oregon pine; floors are of Oregon pine or Singapore redwood. This latter wood is also extensively used for cabinet work. A good quality of lock sets is used, generally of British manufacture. The use of reinforced concrete has grown rapidly, and it is now being extensively employed. Expanded metal, wire-mesh and reinforcement bars of every description are in great demand, although at high prices. The demand will, in all probability, greatly increase. Cement is being consumed in increasing quantities, the demand being met from mills in or near China. Before the war Belgium was practically the only source of supply for window glass; now it is obtained from Japan and America.

As the result of a meeting lately held at the Royal Academy, an address of protest against the National Gallery Bill has been signed by thirty-seven Academicians and twenty-three Associates and also by twelve representatives of other Art Societies, and has been sent to the First Lord of the Treasury. The address says:—"It has already been pointed out in the debate on the Bill in the House of Lords that pictures which could be spared as of little value to the National Gallery would be of equally little value in the market; and that, if the object in view is to gain money for the purchase of works of the great masters which would be desirable additions to the National Collection, any sum which could be raised by this means for the funds of the Gallery would be a negligible quantity for the purpose. We do not suppose that it is within the intentions of the promoters of the Bill that the Trustees should part with any of the numerous works which give special lustre to our National Collection, and we should greatly deplore any breaking-up of the unique collection of Turner's works; yet it is by such measures alone that any substantial addition could be made to the funds. Again, the fluctuations of taste in the future, on the part either of the Trustees or of the public, might bring about results which would seriously injure the National Collection. It was also most justly pointed out in the debate in the House of Lords how discouraging the effect of granting the necessary powers might be on future donors and testators, who would feel that there was no guarantee that gifts or bequests, accepted by the Trustees for the time being, would be regarded as sacred in the future. The principle that gifts and bequests may be diverted from their purpose, once admitted, could not but act as a deterrent to those whose liberal appreciation of the fine arts might take the form of a desire to add to the national treasures."

An order was issued by the Minister of Munitions last Friday taking control of the purchase and sale of lead. Licences will be required except in regard to lead of a certain value specified in the order, and for certain small contracts and for type casting from lead already in the form of type or already purchased for that purpose. All persons are ordered to send within 10 days from February 1, and monthly thereafter, particulars of stocks. Applications for licences must be made to the Director of Materials (A.M. 2 (E)), Hotel Victoria, Northumberland Avenue, London, S.W.

The Army Council announce that they have taken steps, under the Defence of the Realm Regulations, to assume control of all stocks in the United Kingdom of soft-sawn timber, both planed and unplaned, including sleepers, in order to safeguard supplies for military purposes and to prevent further inflation of prices. All dealings in stocks of timber of these descriptions is prohibited until further notice, subject to the proviso that deliveries may be made under existing contracts or that sales may be made to any one person of not more than two standards at prices not exceeding those current during last week. The purchase of timber of these descriptions not already in stock in the United Kingdom is also prohibited until further notice. A further announcement will be made in the course of a few days.

The ways of the Metropolitan Water Board, remarks the *City Press*, are beyond comprehension. The water rate payable for the six months to end in March is £3 10s. on the Lord Mayor's stables, and £45 13s. 7d. on the Guildhall Library and Museum. In the latter case the daily consumption is a question of a few gallons only at the very outside. In the former the quantity must be approaching a hundred times that figure. It is the old story of rateable value!

At the meeting of the Dublin Port and Docks Board on the 24th ult., applications for the position of engineer to the Board were considered. The candidates were:—Messrs. H. T. O. Day, Joseph Mallagh, Ernest Tarrant, and H. Wayte. The final voting was Mallagh, 18; Wayte, 3. The chairman asked if he was to announce to the successful candidate the terms under which he was to enter into his appointment. Mr. Scott said that he understood from Mr. Mallagh's application that the salary mentioned by him was £500. Mr. Field, M.P., said it was an extraordinary thing to give a man £650 a year who offered himself at £500. Mr. Scott pointed out that the recommendation of the committee was that the engineer should be appointed on approbation for 12 months at £650, and that he be granted no increase until one year after that period. Mr. Mallagh agreed to accept these terms, and thanked the Board for his appointment.

What, asks the *Manchester Guardian*, will be the effect of the war upon heraldry? Shall we see guns and tanks "quartered" on the crests and arms that the Heralds Office will inscribe on its roll during the next few months? Lord Armstrong has a crest with two blacksmiths shouldering hammers, whilst Lord Wimborne has also the blacksmith's hammer on his arms. Both these are reminiscent of the industries that helped to lay the family fortunes. Newspaper proprietors like Lord Northcliffe and Sir Frank Newnes, Bart., have rolls of paper in their armorial bearings. The College of Heralds, which dates from the reign of Richard III., must find the allocation of arms a difficult matter, for no two family crests must be alike. Something in the way of guns or machinery would be a relief to the Principal Garter King of Arms, Sir Alfred Scott-Gatty.

The Public Health Committee of the London County Council, having had its attention drawn to the fact that serious delay is taking place in the collection of house refuse in the metropolitan borough of St. Pancras, and that the refuse in some portions of the northern part of the borough has not been removed since the week before Christmas, and that in many other parts of the borough only one collection has been made since Christmas, while recognising that the borough council has experienced considerable difficulty in disposing of refuse, the committee points out that in this matter the position in St. Pancras is without parallel in any other part of the county. Inquiries show that, while in several other metropolitan boroughs somewhat similar difficulties have arisen owing to the shortage of labour, in no instance has there been failure to collect and dispose of house refuse for so prolonged a period of time as in St. Pancras. The delay which has arisen in this case is a serious menace to the public health. In view of the failure of the borough council to provide a remedy for the existing conditions, and as it holds out no hope of any immediate improvement, there is no alternative but to advise the council to make representations to the Local Government Board under section 101 of the Public Health (London) Act, 1891, that the sanitary authority has made default in executing the provisions of the Act. The committee recommended on Tuesday, therefore, "That complaint be made to the Local Government Board under section 101 of the Public Health (London) Act, 1891, that the St. Pancras Metropolitan Borough Council, as sanitary authority, has made default in executing the provisions of that Act relating to the removal of house refuse in the borough."

TO CORRESPONDENTS

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C., and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

***Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.

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Telegrams: "Timeserver, Estrand, London."

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Advertisements for the current week must reach the office not later than 3 p.m. on Tuesday. Front-page advertisements and alterations or stop orders for serial advertisements must reach the office by first post on Monday to secure attention.

RECEIVED.—F. C. H.—Q. M. C.—R. F. W. and Son—P. and Co.—V. de T. A. Co., Ltd.—W. C. Co., Ltd.—M. G. and Co.—W. S. and Son—G. and B.—R. B. and Son—W. and W.—J. S. S.—C. C. D. and Co.—D. and Co.—W. and Co.—F. A. N. and Co.—F. and J.—S. S.—T. B. B. and Co., Ltd.

ANZAC.—Yes.

T. R. M.—Please send.

MAJOR T.—Forwarded as directed. 2. No.

J. G. H.—Thanks for proffered co-operation, but at present we cannot avail ourselves thereof.

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COMPETITIONS OPEN.

March 3.—Water Supply and Sewerage Scheme (premium 5,000 pesetas—about £200), Manzanares, Spain.—Secretaria del Ayuntamiento, Manzanares.

LIST OF TENDERS OPEN.

BUILDINGS.

Feb. 28.—New bathrooms, lavatories, etc., at the Louth County Infirmary.—J. W. Turner, J.P., Secretary, Louth County Infirmary.

No date.—Erection of 33 pairs of Cottages near Holbeach Clough, Lincolnshire. Approximate distance from Holbeach Station, from three to five miles. The work is to be divided into sections of three pairs, and tenders may be submitted for one or more sections. Building to commence in April, and the work must be completed by end of September this year.—For the Board of Agriculture and Fisheries.—Secretary, Board of Agriculture and Fisheries, 4, Whitehall Place, London, S.W.

ENGINEERING.

Feb. 28.—Construction of two Masonry Dams across the Parbati River in respect of hydro-electric waterworks and irrigation schemes, amounting to about Rs.30,00,000, equal to £200,000 each; one near Budh, and the other between Bassai and Kaketo.—S. K. Gurtu, Member Board of Revenue for Irrigation, Gwalior Government, Moti-Mahal, Lashkar, Gwalior, Central India.

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

FENCES AND WALLS.

March 30.—Wrought-iron Gates and Fencing, for the Central Wharf and Quay Street Landing, Auckland, N.Z.—For the Harbour Board.—The Commercial Intelligence Department, 73, Basinghall Street, E.C.

PAINTING.

Feb. 13.—Cleaning down, Painting, etc., at various police stations in Leeds.—Town Clerk's Office, Great George Street, Leeds.

Feb. 24.—Repainting and Decorating St. Mary's Parish Church, Newry.—Designs and specification can be inspected at the office of Mr. S. W. Reside, Architect, Margaret Square, Newry. Tenders to be sent to the Rev. H. B. Swanzey, M.A., The Vicarage, Newry.

ROADS AND STREETS.

Feb. 9.—About 5,800 tons of Granite, about 5,400 tons of Slag, about 550 tons of Slag Chips, and about 200 tons of Tar-Macadam, to be delivered to various stations and wharves in the district.—For the Caister (Lincs.) Rural District Council.—A. A. Padley, Clerk, Council Offices, Caister.

Feb. 9.—Granite, Flints, Kentish Ragstone, Tar Macadam, Gravel, Chalk, etc.; haulage of materials from railway stations, etc., cartage of materials from depots; team labour by the day and hour; supply of tools, oils, etc., fuel, bricks, cement, iron and stoneware pipes, etc., tar-washing surfaces of roads and paths (one year).—For the Reigate Rural District Council.—F. C. Morrison, Clerk, 46, High Street, Reigate.

Feb. 9.—Granite, Tarred Granite and Slag, Gravel, Flints and Hoggin, hauling and purchase of Road Sand and Sweepings (one year).—For the Uxbridge Rural District Council.—C. Woodbridge, Clerk, 38, High Street, Uxbridge.

Feb. 10.—Surface tarring approximately 1,250,000 square yards of main roads with refined tar during ensuing spring and summer.—For the Hertfordshire County Council.—J. S. Killick, County Surveyor, Hatfield.

Feb. 10.—Stone and tarmac for the roads within the district.—For the Bridgwater Rural District Council.—W. H. Cousins, Surveyor's Office, Union Workhouse, Bridgwater.

Feb. 10.—Best selected granite, broken and unbroken, and unscreened ¼ in. granite chippings, to be delivered free of charge and wharfage.—For the Rural District Council.—A. Walker, Windmill Road, New Headington.

Feb. 12.—Supplying, breaking, and carting stone required for the maintenance of the county roads (one year).—For the Northumberland County Council Bridges and Roads Committee.—County Surveyor, Moothall, Newcastle-on-Tyne.

Feb. 12.—Supply and Delivery of Clean, Hand-picked Field Flints on Main Roads during ensuing spring and summer.—For the Bucks County Council Highways Committee.—E. Winfield, Acting County Surveyor, County Hall, Aylesbury.

Feb. 13.—400 tons XX granite (broken), 200 tons XXX granite (broken), 160 tons X granite, 140 tons 2½-in. slag, and 200 tons ½-in. granite chips.—For the Long Sutton Urban District Council.—S. S. Mossop, Clerk, Long Sutton.

Feb. 14.—About 5,750 tons of Broken Granite, 1,904 tons of Granite Chips, 2,230 tons of Slag, 200 tons of Slag Dust, 209 tons of Coarse Builders' Sand, and 400 barrels of Refined Tar.—For the Holland (Lincolnshire) County Council.—W. H. Gane, Clerk of the County Council, Sessions House, Boston.

Feb. 15.—Supply and delivery in full truck loads, as required, to Newmarket and Burwell (G.E.R.) railway stations as follows:—Best broken Leicestershire granite, 1½ in., 2 in., 2½ in. gauge, about 1,000 tons; best broken slag, 2½ in. gauge, about 200 tons; granite or slag chippings, free from dust, ⅜ in. gauge, about 500 tons; ⅜ in. tarviated granite chippings, about 250 tons.—For the Newmarket Urban District Council.—E. R. Ennion, Acting Clerk to the Council, Deva Chambers, Newmarket.

Feb. 15.—Broken Roadstone, Tar Macadam, and Cob Limestone, to be delivered, carriage paid, to various railway stations, in quantities required by the surveyor (One Year).—For the Wetherby Rural District Council.—E. H. Coates, Clerk to the Council, Wetherby.

Feb. 17.—Supplying best Hand-picked and Broken Granite and Grouce at Cropredy, Broadmoor Bridge, Claydon, Banbury, Nell Bridge and Twyford Wharves, and at Banbury, Cropredy, Bloxham, Adderbury, and Hook Norton Railway Stations.—For the Banbury Rural District Council.—E. L. Fisher, Clerk, Union Offices, Banbury.

Feb. 17.—Leicestershire Granite and Granite Chippings; selected Ironstone Slag, free from comb; best Derby Limestone; Broken Pit or Dug Flints and best bright Pit Hoggin and Shingle; cartage of the above materials (One Year).—For the Kingsbury (Middlesex) Urban District Council.—H. H. Turner, Clerk, Council Offices, Kingsbury Road, Kingsbury.

Feb. 21.—Granite, Limestone, Slag, Basalt, Tarred Limestone, Tarred Slag, Refined Tar, Pitch, Kerb, Channel, Sand, and Stoneware Pipes (One Year).—For the Folsover Urban District Council.—J. F. Wardle, Town Surveyor, Council Offices, Bolsover.

Feb. 22.—Granite and Slag (One Year), to be delivered at various stations and wharves in the district of Bridgnorth.—For the Rural District Council.—F. Richards, Surveyor, Bridgnorth.

Feb. 23.—Granite macadam and chippings; Macclesfield macadam and chippings; limestone macadam and chippings; 6-in. grit stone setts; sanitary pipes (One Year).—For the Marple Urban District Council.—D. J. Diver, Surveyor, Council Offices, Marple.

Feb. 24.—Granite Slag and Tarred Macadam, to be delivered at various railway stations in the district. Team labour necessary in carting the material on to the roads where required (One Year).—For the Rotherham Rural District Council.—Oxley and Coward, Clerks to the Council, 6, Westgate, Rotherham.

STORES.

Feb. 9.—Materials required during the year ending March 31, 1918—namely, broken granite, tarred slag, kerbs, setts, stoneware pipes and gullies, cement, hire of steam road roller, pitch and creosote oil, disinfectants, scavenging brooms, iron castings, provender, and team labour.—For the Irlam Urban District Council.—R. H. Winterbottom, Surveyor, Council Offices, Irlam.

Feb. 13.—Materials (One Year).—Tar; Tar-spraying; Granite and Chippings; Harness; Cartage—House Refuse Removal, General and Piece-work; Forage; Disinfectants; Coke.—For the Southgate Urban District Council.—A. E. Lauder, Clerk, Council Offices, Palmer's Green.

Feb. 13.—Stores and Materials (One Year) and Execution of Work (One Year).—Stores, Tools, etc.; Stoneware Pipes, Gully Traps, etc.; Portland Cement; House and Steam Coal and Gas Coke; Flints, Gravel, and Sand; Broken Granite; Kerb, Channel and Crossings; Tar-paving Materials; Tar-paving (laid); Collection and Disposal of House Refuse; Hire of Horses, Carts, and Men; cartage of Highway Materials.—For the Mitcham Urban District Council.—Council Offices, Vestry Hall, Mitcham.

Feb. 19.—Supply of Roadstone and Setts; Kerbstone, Flags, etc.; Slag or Furnace Dross; Tarred Slag and Limestone; Pitch, Creosote Oil, and Refined Tar; Sand and Gravel; Drainage Pipes, etc.; Blue Channel Bricks; Bricks; Cement; Brooms; Paints; Picks and Shovels; Oils, Paraffin and Cotton Wastes; Disinfectants (One Year.)—For the Doncaster Corporation.—R. E. Ford, A.M.I.C.E., Acting Borough Surveyor, Mansion House, Doncaster.

Mr. J. W. Lupton, highways surveyor to the Flaxton Rural District Council, has been voted a bonus of £10 per annum.

The St. Austell Urban District Council have agreed to a scheme for the erection of an isolation hospital for twenty beds.

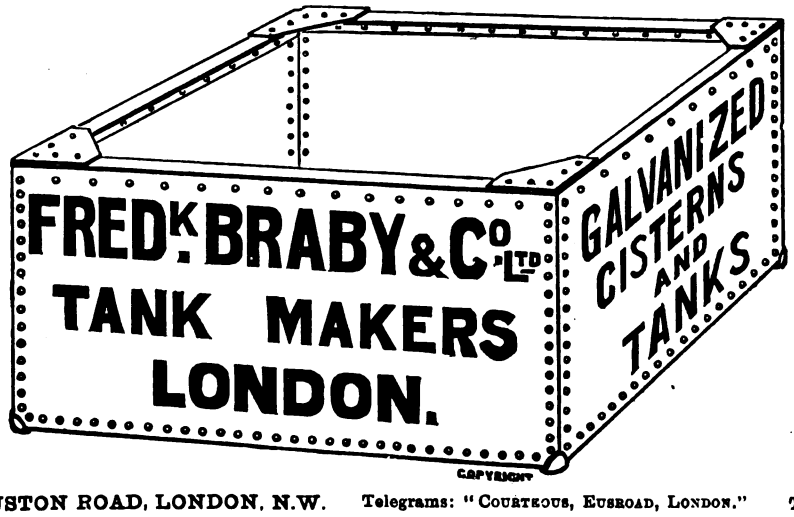
The death in action is announced of Pte. Daniel Edward Watney (Royal Fusiliers), only son of Mr. and Mrs. Walter Daniel Watney, 4a, Frederick's Place, E.C.

At the request of the Ministry of Munitions, the Fine Art Society, New Bond Street, will open an exhibition next Saturday of Mr. Joseph Pennell's drawings and lithographs of war work.

The worst salt subsidence of the last twenty years occurred last Friday morning on London Road, Northwich. The cracks extend a hundred yards. A crater 60 ft. long and 70 ft. wide has swallowed up the road surface, and some abutments of the bridge crossing the river Dane have sunk in the cavity. The road is completely blocked.

A requisition was presented to the Lord Mayor of Dublin last Friday asking him to summon a conference to consider the question of housing in the city with a view to preparing a plan for its solution at the end of the war. The requisition bears the signatures of the two Archbishops of Dublin, Sir Edward Carson, the six members for the City and County of Dublin, the Recorder of Dublin, and others.

M. Auguste Rodin, the great sculptor, was married on January 30 to Mlle. Rose Beurre, at his house at Meudon. M. Clementel, Minister of Commerce, and M. Dalimier, Under-Secretary of Fine Arts, took part in the ceremony. Auguste Rodin was born in 1840, and during the siege of Paris served as a corporal in the National Guard. He had a long struggle to secure recognition, and the disheartening experience of having his work rejected time after time by the Salon.



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February 14, 1917. Volume CXII.—No. 3241.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.

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OUR ILLUSTRATIONS.

Block of new Business Premises now nearing completion, Kingsway and Lincoln's Inn Fields, W.C. Elevations, plans, and section. Mr. M. E. Collins, F.R.I.B.A., Architect.

The Dressmakers' Balcony near the Grand Canal, Venice. The Royal Academy Exhibition of Graphic Art. From an etching by Mr. Clifford Addams.

The Grange Great Barn, Alciston, near Alfriston, Sussex. The Royal Academy Exhibition of Graphic Art. From a lithograph by Miss Dorothy F. Roberts.

A Pair of Wrought-iron Gates, St. Peter's Church, London Docks, Shadwell, E. Mr. Maurice B. Adams, F.R.I.B.A., Architect.

A Worthy War Memorial: Suggestions by Messrs. William Woodward and Sons for a War Memorial Chapel at Westminster.

Currente Calamo.

Mr. Edwin Savill's paper on the Defence of the Realm Acquisition of Land Act, read at the Surveyors' Institution on Monday night, is a very timely and valuable one. Much controversy marked the passage of the Bill through both Houses of Parliament, and more would have hindered its discussion had not the Department concerned—wiser for once than most others—taken the sensible step of submitting the first draft to the members of the Council of the Surveyors' Institution, and subsequently a later draft to the Council itself. The assistance rendered ought to induce the Department concerned and others to adopt a similar course always. Had they done so from the beginning of the war we should have been saved much waste, many blunders, and some scandals. When we remember that 150,000 acres of land have been taken over by the Government since the war started, and that the annual value of buildings thus acquired is approximately two and a-half millions sterling, it may be taken for granted that readers professionally concerned will have some problems to consider and some hitches to straighten out. By such, and by all concerned, Mr. Savill's luminous notes will be found most helpful, and we congratulate the Surveyors' Institution on its addition to the excellent list of papers it has been able to maintain during the present session.

Very proper protests are being made by some of the architects of Manchester against the latest proposals of one of the City Council's committees to turn the infirmary site into a tramway centre. The embarrassments of Cottonopolis with regard to the site have been many, but surely this scheme will be reconsidered? We entirely endorse the plea of Mr. Richard Anderton, A.R.I.B.A., who, writing from 187, Market Road, Ashton-under-Lyne, to the *Manchester Guardian* of Monday last, says:—"It would be regrettable almost to sacrilege to cripple the future of this site by embarking upon a short-sighted policy at this stage. To lose the splendid opportunity of creating a civic centre, a worthy nucleus in the shining and far-reaching nebula of our Lancashire progress, and to turn the site into a mere tramway shunting centre of lines and loops, is like using honey to grease the wheels of a handcart. Just now art is overshadowed by the war, in which it helps to the best of its limited ability, but it may surely meekly plead against the possible vandalism of an uncurbed utilitarian invasion at a time when the hand of man is held back from the arts of peace."

The War Office seems to have acted with commendable promptness in issuing the recent timber regulations. It seems that it became known in official quarters late on Saturday week that Germany had declared Swedish timber contraband. Public knowledge of this enemy proclamation would almost certainly have led to a rapid inflation of prices in the timber markets. The effect of this Order, by which the War Office, using its powers under the Defence of the Realm Regulations, on the following Monday took over all stocks of soft-sawn timber in the country, was to prevent artificial forcing-up of timber prices. Thereby the National Exchequer will be saved considerable sums, for the Government is now the biggest purchaser of wood in this country.

Covenants to repair in leases still seem to hold the field for the encouragement of costly litigation. Their construction by the Courts is of much practical and pecuniary interest to property owners and to the building trades. In the recent case of "Westacott v. Hahn" we have a good example of the law at its worst and costliest. In his judgment, the Lord Chief Justice, with unconscious humour, said the "problem was to find out the intention of the parties" from the wording of the lease. This pretty problem had been referred to arbitration, which was for the time suspended in order that the High Court might be consulted. Yet it all looks simple enough as a matter of business. The tenant covenanted to do repairs, he "being allowed all necessary materials for that purpose" by the landlord. The whole point was whether this obligation to supply the materials was a covenant by the lessor to do so, or only a condition of the lessee's covenant to repair. It was a truly technical point, and it enabled the judges to range at will over some centuries of ancient learned lore. But, of course, all these old authorities were on the side of the Lords of the Land. So it was solemnly decided that the lease threw a primary obligation on the tenant to do these repairs, which he was not bound to perform until the landlord supplied the materials. This was the view of two judges, but the third held it was the landlord's covenant as to materials which came first. Now the case goes back to the Arbitrator to act on the ruling of the majority and to see what he can make of it. Yet, if the lease had been worded in plain English all this bother would have been saved. These problems to find out the intentions of the parties are certainly not set by those parties themselves. Some people think they are arranged by the lawyers for other lawyers to unravel at their leisure. We foresee that, at the end of this needless litigation, the really burning question will be: which side is to pay the costs of all this waste of legal argument and judicial learning.

One method of accelerating the artistic impulse, and one that would seem to offer great possibilities, has, says the *American Architect*, been adopted in the South American city of Buenos Ayres. That municipality exempts from taxation each year the most beautiful building erected during the preceding twelve months, and in addition awards a medal to the architect. A more direct form of encouragement, or one that would possess a greater appeal for the average owner, it would be difficult to devise. It is possible that the decoration of the architect may be unnecessary to the success of the plan, but doubtless it is with the idea of taking cognisance rather than paying a reward that the medal is bestowed. The plan might well receive consideration by municipalities in this country. Then, possibly, the average citizen would learn to appreciate the inherent as well as the commercial value of good architecture to an extent that might render unnecessary the offer of any special prize or distinction to induce him to co-operate in the production of architecturally meritorious buildings.

The sending of rolling stock to France has brought about, as was inevitable, seri-

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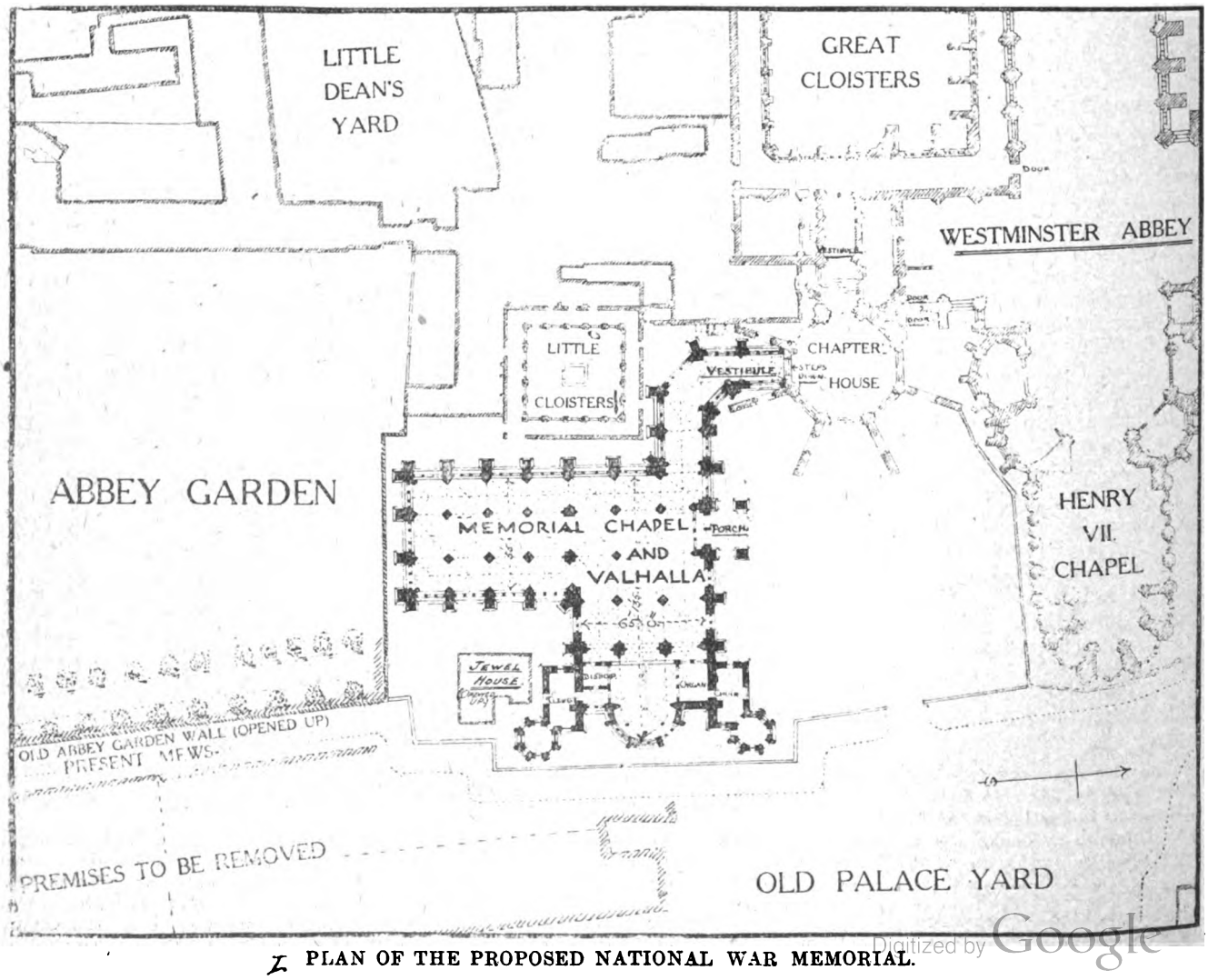
ous congestion on the railways. Are we making full use of our other modes of transport? A speech last week of the Chairman of the Rochdale Canal Company suggests, and we believe rightly, that we are not. He complained that for some time one-half of the company's fleet had been idle owing to the shortage of labour. As usual, the canals are being asked to relieve the railways, while the military are taking more and more men. That the two things are incompatible does not seem apparent to the authorities, nor do they see how serious are the reactions. Sir Norman Hill tells us that the slowness in loading and unloading ships reduces very heavily the efficiency of our mercantile marine, every ton of which is precious in these critical months. The warehouses and wharves are loaded with goods because the railways have not the rolling stock to remove them. Meanwhile the canals, which could help, and so release merchant ships, are compelled to keep half their fleet idle for lack of labour.

In the report of their proceedings during the past year the Employers' Parliamentary Council express the opinion that when the time comes for taking stock of the nation's industrial resources, in view of the universal competition which will rule the markets of the world, it will be found that any return, even on a small scale, to the conditions which governed national production in the period before the war would be disastrous and possibly fatal to British interests both at home and abroad. It may, say the Council, be assumed as extremely unlikely that the systematic restriction of output which prevailed before the war, and is, unhappily, still existent, will ever again find favour in this country outside the ranks of the labour unions. There is evidence on every hand of the growing feeling of distrust in the old methods of labour unionism. The fact of those methods having to be abandoned to meet national necessities has impressed itself strongly even on the minds of those who formerly excused them as promoting the interests of labour. The demand that after the war labour shall take a larger share of the profits of industry, a demand that has been endorsed by several members of the Government, and with which sympathy has been expressed in many influential quarters, is one to which no reasonable exception can be taken, provided that labour, earnestly and whole-heartedly, performs its part in the general scheme of production, and thus establishes a good title to the claim for greater remuneration. A high standard of production can be maintained only if the energies of capital and labour alike are exerted to their utmost capacity. Whatever the conditions under which various industries are conducted in the future, whether systems of co-partnership, or profit-sharing, or wages, the effort everywhere will have to be of a generally sympathetic and high-spirited character if all concerned are to benefit in the shape of increased gains. It has been frequently suggested of late that the war has broken down class barriers, and that the old element of suspicion, which it is alleged pervaded the relations between rich and poor, capital and labour, will have disappeared when the ordinary life of the nation is resumed. If this should prove to be so, and all classes unite in the common aim of ensuring the nation's prosperity and progress, there will be no room for strife and strikes, but each and all will be animated by mutual trust, and strive for the best results which friendly combination and co-operation can hope to achieve. If it is not so we are on the eve of an upheaval, the perils of which will far exceed those of the present troublous time.

A WORTHY WAR MEMORIAL.

We expressed our opinion in our issue of January 3 last that it was none too early to consider the nature and location of the great central war memorial which we take it will be set up in the capital of the Empire to perpetuate the remembrance of the heroism of its citizens in the world-wide struggle that is being waged in defence of all that is sacred to liberty, against the allies of the powers of darkness and barbarism, and we rejoice greatly to find that a prominent firm of architects are first in the field with a suggestion that will appeal to every Briton. With the great Abbey Church of Westminster are intertwined the undying memories of those who through many centuries have best served England. Within its walls sleep the greatest of her kings, the stoutest of her warriors, and the most famous of all who have given life, or life service, for her



PLAN OF THE PROPOSED NATIONAL WAR MEMORIAL.

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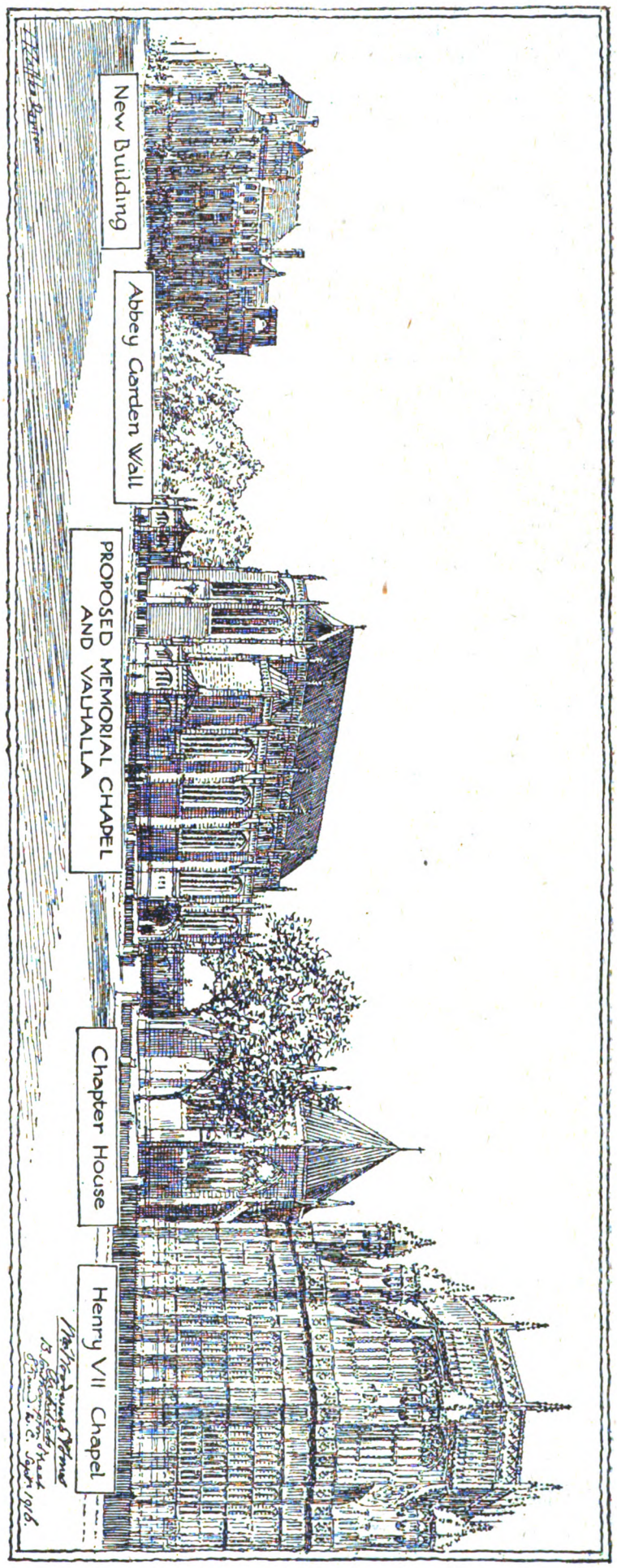
weal. For years past it has been manifest that the limits of the great church as regards space for the graves or cenotaphs of our great dead were fast closing. From time to time suggestions have been made with the view of providing a memorial chapel for the reception of national memorials as an adjunct to the Abbey, some of which have been illustrated in our own pages. To all of these objections of various kinds have been taken, on better or worse grounds, but we can see none that should hinder the adoption of the scheme we herewith illustrate, by the courtesy of the *Daily Chronicle*, and with the proposition of which Messrs. William Woodward and Sons are first in the field.

The suggestion as regards location is, of course, not new, as the *Daily Chronicle* points out, but the opportunities for compassing it and the method of utilising them are, and we certainly regret to see it stated by our contemporary that the present Abbey authorities are not in favour of a memorial chapel to be erected in connection with the great building of which they are the guardians. They are not so large-minded as the late Deans Stanley and Bradley, who were both strongly in favour of the scheme. The matter, however, is not one for the Abbey authorities to settle, but for Parliament and the Governments of the Empire. That the nation and its representatives will receive Messrs. Woodward and Sons' suggestion with sympathetic approval we cannot but feel certain, and the more so because their idea is presented in a practical and really artistic form, combining the provision of a great national requirement with that of a most desirable metropolitan improvement.

If any readers will take a walk to Millbank, as far as the Victoria Tower, they will see a block of mean-looking buildings (the property of the Ecclesiastical Commissioners), facing Abingdon Street and extending southwards from the Chapter House of the Abbey to Great College Street. These buildings constitute a blot upon the surroundings which have, during the last few years, been, at great cost, so much improved. The removal of these buildings would open up to public view the ancient wall enclosing the fine old "Abbey Garden," now buried away at the side of the mews which runs along at the rear of the buildings proposed to be demolished. The fine trees in this garden would then be seen from Abingdon Street, and there would also be exposed to view the old "Jewel House," which is also now covered up by these obstructive buildings, which, we understand, the Ecclesiastical Commissioners themselves are proposing to pull down, and to let the site on a building lease. It will be seen by the plan that the Chapter House (which was opened up a few years ago by the removal of old buildings) would then form the central feature between Henry VII. Chapel and the proposed Memorial Chapel.

In 1890 and 1891 a "Royal Commission on the present want of space for Monuments in Westminster Abbey" sat, and much interesting evidence was given before it by architects and by distinguished clergy and laymen, and it was then agreed that there was not space for many more memorials in the Abbey itself, and that there should be no interference with the present Abbey monuments. The idea then was that a Memorial Chapel for future monuments should be provided, that it should be erected as an adjunct to the Abbey, and that it should provide for monuments for the next hundred or two hundred years. The then Archbishop of Canterbury said that it should be a building sacred in the sense "that it should be possible to be used for services like the rest of the Abbey, as any of the chapels might be."



The proposed chapel would be reached from the Abbey through the doorway leading to the east walk of the "Great Cloisters," and by the "Vestibule" from that walk through the Chapter House. It could also be reached through the doorway into the Chapter House from the south transept of the

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Abbey. The new vestibule would be reached through an opening to be made in one bay of the Chapter House, which would be formed without any interference with the window above, and a principal entrance and exit are shown by the porch next Old Palace Yard, which provides also for carriages.

Memorials to Lord Kitchener, Nurse Cavell, Captain Fryatt, and the many other heroes, naval and military, who have fallen in the war, would be the first to find a place in the Valhalla; and the monument to King Edward VII. might very well be placed there instead of in Waterloo Place, as now proposed, unless, of course, it is to be an equestrian monument.

We quite conceive that modifications of the plan may be found necessary when a detailed survey is made, and we suggest that the authorities concerned should facilitate the preparation of such by Messrs. William Woodward and Sons, in readiness for its final presentation to Parliament at an early period.

THE ARCHITECT AND THE THEATRE.*

By W. A. ROBERTSON.

Although we have evidence that until within the last century architects were employed by the giants of the profession of scenic artists, the architect of to-day is not usually employed in collaboration with the scenic artist.

The claim of the architect that scenic design is part of his profession and birthright can be sustained by precedent as far back as the days of ancient Greece. The actor-manager of the ancient Greek classic theatre must undoubtedly have been a client that the architect of that day thought well worthy of cultivation, his scenery being of no frail canvas and paint.

Travelling down through the history of the Middle Ages, when the monastic "architect" would, no doubt, gratuitously supervise the setting of the Miracle plays, we have many examples existing of the close connection between the architects of the Renaissance and the theatre. Palladio's "back-cloth," built in stone, is still the set scene at Vicenza, and numerous drawings are to be seen of Inigo Jones' work for the command performance of the first Charles.

Recently in one of the largest towns in the provinces I sat in a music-hall which had been built to the design of, and, what is even more important, been decorated by, our finest civic architect. The front of the house possessed a charm which, unfortunately, was utterly destroyed on the rise of the curtain, when the usual back-cloth was displayed depicting a room redolent of the most offensive rococo decorations. This particular back-cloth, painted for the opening of the theatre upon its completion some four or five years ago, was typical of its successors. What an opportunity the management had missed for applying their architect's criterion of good taste to the stage side of the proscenium so that it harmonised with the auditorium.

The whole education of the architect, which is one of the most liberal in the world, fits him for the position of art critic in the theatre. His sure sense of perspective and knowledge of archæology would relieve the historic play of many of its nightmares, if only he had some say in the matter of the accuracy of the scenic artist's designs. His pre-eminence in archæology and perspective have been readily realised and utilised by painters of large pictures.

The architect might well find a further field of operation in his daily professional work, in the matter of supervising stage scenery. Should the setting be a garden, he has at his finger-tips the correct method of depicting an herbaceous border, a yew-hedge, or a fountain, and to design for a scenic artist a mediæval castle would be to him a delightful change from the utilitarian business premises he designs to meet present-day requirements; the stage would thus become the happy inheritor of those dream castles and cathedrals which are too costly to be built of solid stone.

The charm of Mr. Gordon Craig's work, which is so universally admired, is due in a large degree to the feeling of architectural solidity which it conveys: the fact that he was not trained as an architect I have always felt rather added to the greatness of his genius.

It will be argued by the producer and the stage-manager also that the conditions governing scenic design are so entirely different from those under which an architect's work is produced that he would fail to grasp the limitations under which they labour. There need be no fear that these permanent limitations would be an obstacle to a man who has found that every new commission he received bristled with hitherto unmet limitations of a much more rigid nature, and upon the successful surmounting of which his professional career depended.

It would be strange if a man who can design and erect a sanatorium or a university without having been either a patient in one or a student in the other should find a great difficulty in adapting himself to the controlling elements of scenic design, and I am looking forward to the time when an enterprising manager will give architects a chance of showing their adaptability to the requirements of the stage and surprise everybody by their fuller grasp and utilisation of all its possibilities.

From *Drawing*.

SOME NOTES ON THE DEFENCE OF THE REALM (ACQUISITION OF LAND) ACT, 1916.*

By EDWIN SAVILL (MEMBER OF COUNCIL).

When considering how to deal with a paper on this subject, I thought of writing a short history of the events which led up to the need for the Act. This might possibly have been of interest, but when I had completed my notes upon the Act itself I realised that your patience would be fully taxed in listening to them, and as it is not material to the subject under discussion, I reluctantly decided that the history should be omitted. I should, however, like to draw attention to the huge increase in the area of the property under the control of Government Departments; to the increase in, or rather the creation of, the Lands Branch of the War Office and the Ministry of Munitions, now happily amalgamated; to the work of organisation, construction, and control, and to the resultant difficulties and successes. But I will merely beg you to dwell on the fact that 150,000 acres of land have been taken over since the beginning of the war, and that the annual value of buildings acquired during the same period is approximately £2,500,000.

The reasons for the introduction of the Bill were clearly set out in the memorandum attached thereto. The main object was the protection of the State against the loss it might have incurred owing to the fact that buildings of various kinds erected on land belonging to private owners, possibly with valuable machinery attached, would in the ordinary course have reverted to the owners of the land. No doubt, under the Defence of the Realm Acts, whose buildings could be removed, but in many instances they are of great value where they stand, and, if removed, would be of little value. Businesses having a potential value to the State have been created, and without such an Act as this they might have been destroyed or have passed gratuitously into the hands of the owners of the land.

I need not follow the progress of the Bill through both Houses of Parliament, although the debates were of great interest. Much matter for controversy arose, but much was avoided by reason of the Department taking what we must consider the very wise course of referring the first draft to two members of our Council, and, subsequently, a later draft to the Council itself. One can only wish other Departments would more freely consult this Institution upon technical matters. I feel sure that I may say on behalf of this Institution that the unique knowledge and experience which is here available would always be placed entirely at the service of the Department, and that all questions referred to the Institution would invariably be considered judicially and from the point of view of the national interest, without regard to any political party or selfish considerations.

With these few remarks I will come to the Act itself.

SECTIONS 1 AND 2.

Give powers to certain Government Departments already in temporary possession of any land to continue the occupation for a certain period after the war, and during that time to remove any buildings which have been erected at the expense of the State.

Land.—Under Section 12, Subsection (1), land is stated to include any building, or part of a building, any pier, jetty, or other structure on the shore or bed of the sea or any river, and any easement or right over or in relation to land.

SECTION 1.

Subsection (1).—The powers under this section relate to any land of which possession has been taken during the course of the war or within the week immediately preceding its commencement. The ruling date, therefore, is July 28, 1914.

Possession must have been taken of the land by or on behalf of a Government department for purposes connected with the present war, whether in exercise or purported exercise of any prerogative right of His Majesty, or of any powers conferred by or under any enactment relating to the Defence of the Realm, or by agreement or otherwise. The Government department in possession may, after the termination of the war, continue in possession for a period not exceeding two years, and, with the consent of the Railway and Canal Commission, referred to as "the Commission," for a further period not exceeding three years, making five years in all.

The department must be in possession at the termination of the war.

A certificate by any Government department shall be primâ facie evidence that the land is in possession of the department. (Section 10 (a).)

The period of two years runs from the termination of the war. To extend this period the department must make application to the Commission six months before its termination, and the continuance of occupation can only be with its consent, the department having to show that it is necessary or expedient in the national interest.

The occupying department may transfer possession to the Admiralty, Army Council, or Minister of Munitions.

There are at least three points upon this subsection which appear to me to require clearing up:—

1. Nothing is said as to the owner or former occupier of the land having the right to appear before the Commission to protest against the continuance of the occupation after two years. One must assume that he would be given such right, and that the Commission would take into consideration his objection.

2. The same omission applies to the provision that the certificate of a Government department is primâ facie evidence that the department is in possession. This question is likely to lead to much dispute, and the owner should certainly be heard.

The words "during the course of the war" will at some future time need definition.

3. Apparently the occupying department can give up possession of the land at any time without notice. This is hardly reasonable, because it would almost certainly entail the loss of rent to the owner, even if he knew the land had been vacated, but in many cases he would not know. I have already

* Read at the Ordinary General Meeting of the Surveyors' Institution, held on Monday, February 12, 1917.

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come across instances where the owner is uncertain whether his land is in military occupation or not. Notice has been given to take the land, it has been occupied, and subsequently the troops have left, but no notice having been given to the owner, he does not know whether the vacation is temporary or permanent, and consequently he dare not let his land, and it remains idle and gets into bad condition. If the vacation proves to be permanent he loses his rent, and the strange part about it is that he is unable to ascertain what is the position. In some cases, no doubt, the length of the notice to be given might form part of the terms and conditions, but it would have been reasonable to have placed the obligation upon the department of giving notice within three months of the termination of the war of their desire to continue in possession.

Subsection (2).—The occupying department may, while the land remains in occupation, exercise such powers as were exerciseable during its occupation in war time for the purposes of the Defence of the Realm, subject, as regards the closing of public highways, to Section 6 (3), and as regards the removal of buildings subject to Section 2.

The owner and occupier of adjoining lands are within certain limits safeguarded under (a) and (b), which provide that where, but for the powers contained in this Act, they would have been entitled to restrain the user, they shall under the Act be entitled to compensation during the period of occupation for pollution, abstraction, diversion of water, damage by noxious fumes, and injury to property caused by accident due to the exercise of such powers.

Subsection (3).—Provides for the payment of rent and compensation, the amount, failing agreement, to be determined in accordance with the provisions of this Act.

The wording of this subsection presents many difficulties. The occupying department shall pay rent in respect of any land which continues in its occupation, "and such continuance shall be upon and subject to such terms and conditions as to compensation or otherwise (including compensation for any depreciation attributable to works and buildings not removed)," etc.

The owners appear to be in a very invidious position. They have for the most part given the departments a free hand, that is to say, they have made no objection to the free exercise of all departmental powers, and rents and compensation in many cases have been nominal. Many owners are no doubt anxious to regain possession of their land at the earliest moment compatible with national interest. No provision is made for the occupying department at the termination of the war to give notice to the owner that occupation is to continue. Presumably it may continue automatically for two years, the department having the power to abandon the land before the termination of the two years. Provision is made for fixing the rent, but the terms and conditions as to compensation or otherwise would appear to have to be fixed at the beginning of the continuance. In ordinary circumstances it would seem desirable that the compensation should be settled at the time of the subject-matter of the compensation arising. Compensation for consequential damage might be fixed at the time of the continuance, but compensation for damage to the land for buildings not removed at the expiration of the holding should be fixed when the occupation ceases. Owners will need to be very carefully advised if in fixing the terms many items of compensation are not to be omitted.

The amount of rent is, to a certain extent, governed by paragraph 6 of the Schedule, appreciation or depreciation caused by acts or works of the Government upon it or neighbouring lands not being taken into consideration.

Section 2.

Subsection (1).—Under this subsection the department has the right after the termination of the war, and while it remains in occupation of the land, to remove any buildings or other works it has erected for purposes in connection with the war, or buildings or works erected with the consent of the department at the expense of some person not interested in the land. Provided that (a) where the building or work was erected partly at the expense of the landowner, or (b) where under an agreement with the department the landowner is entitled to the building or work, the department shall not have power to remove the building without the consent of the landowner.

Nothing in this subsection shall prejudice the right of the department where, under an agreement, the department has the right of removal.

It appears obvious that the department must retain possession of all land upon which buildings have been erected pending a decision as to whether the buildings are worth removing, and, in cases where it is decided to remove, the department must retain possession until the removal is completed. This will necessarily entail great delay in the relinquishment of land for which, but for this clause, the department would have no further use. Where buildings occupy a small portion of the land only, it would seem advisable for the department and the owner to come to an arrangement whereby the owner should retake possession subject to the department's right to remove the building within a fixed time. By this means the country would be saved a considerable sum in rent.

Subsection (2).—Where any building or work has been removed under this section, the department shall restore the land to its original condition, or compensate the owner for depreciation caused by the disturbance of the soil.

It must be remembered that the continuance of possession after the war shall be upon terms and conditions as to compensation or otherwise as shall be agreed or arbitrated upon. Section 2 (2) makes provision only for reinstatement of, or compensation for, the disturbance of the soil where buildings or works have been removed, but nothing is said as to reinstatement of, or compensation for, the disturbance of the soil on other parts of the land. For example, where lands are used for an aerodrome a few sheds are erected, and if they are removed, the land upon which they stood has to be reinstated or the owner compensated, but that is a very small part of the damage. Ditches may have been filled in, drains blocked, hedges removed, and timber felled. I assume that if the land is given up at the termination of the war, the owner would be compensated for all these things by the Defence of the Realm (Losses) Commission; but if the department continues in possession after the war, then all these matters must be arranged for in settling the terms of the continuance. If they are omitted, no compensation need be paid.

Subsection (3).—This deals with the removal of buildings and works from commons, and apparently safeguards all interests of the public.

Subsection (4).—Protects the department from claims upon buildings, fixed or attached, machinery, or plant, by mortgagees or others, beyond the owners of the land, who may be interested in the land.

Section 3.

Deals with the purchase of land, and, unlike the preceding sections, which come into force only on the termination of the war, this section came into force upon the passing of the Act, and gives powers to the Government to purchase (a) any land in the possession of an occupying department or any interest in such land; (b) any land on, over, or under which any buildings, works, or improvements have, for purposes connected with the present war, been erected, constructed, or made, wholly or partly at the expense of the State, or any interest in such land. The powers are limited in time to within three years of the termination of the war.

For the purpose of the acquisition of land the provision of the Lands Clauses Act shall be incorporated with this Act subject to the modifications contained in the Schedule to this Act. Therefore notice to treat can now be served upon any owner whose land is in the occupation of one of the Government Departments, or upon which buildings have been erected by such department. It should be remembered that a certificate by the department is *primâ facie* evidence of its being in possession of land, but whether this fact has to be determined before or after the serving of a notice to treat is not clear, although it seems desirable that owners should comply with the provisions of the Lands Clauses Act even though it is considered advisable to dispute the occupation.

Subsection (2).—This subsection gives power to the department to acquire any adjoining or neighbouring land (whether belonging to the same owner or not), or any right of access or other right which appears to the Commission to be required for the proper enjoyment of the land so acquired, but this power can be exercised only during the present war or within three years after its termination.

Again, there is doubt as to whether the notice to treat is to include adjoining land belonging to the same owner, and, if so, whether this has to be the subject of a preliminary inquiry, or is to be dealt with at the hearing of the case for the acquisition of the land in the occupation of the department. If it is to be the subject of a preliminary inquiry, the rights of the owner to appear and give evidence are not clear. If it is to be dealt with subsequently it would be necessary for the arbitrator to give his award subject to the ruling of the Commission as to the department's right to acquire the further land. It appears desirable that this point should be determined before any other steps are taken, otherwise much time and money will inevitably be wasted.

Subsection (3) gives power, if the department desires, to acquire the mines and minerals under the land, with such right of support as the department deems advisable.

Subsection (6) prevents any person removing, destroying, or altering any buildings, works, or improvements erected by the department whilst the rights of the department to acquire the land remain in force.

Subsection (7) gives power to owners having the right of sale to grant or demise the land in perpetuity or for any term of years with or without a right of renewal, or to grant the department an option to acquire the land, but only where such consent is necessary under the Settled Land Acts, with the consent of the trustees or with the sanction of the Court.

Section 4 deals with the manner in which land acquired by the department may be used.

Any land which has been acquired under this Act may be used by any Government department for the purpose for which it was used during the war, or for any other purpose for which it could be used had the land been acquired under the Defence Acts or Military Lands Acts. The owner has no power to restrain such user, nor has any person interested in any neighbouring land, nor anyone who is entitled to any riparian rights; but if, apart from this Act, such person would have been entitled to restrain such user, then, if application is made within three years after the acquisition of the land, or after the commencement of the user causing the depreciation, he shall (i.) be entitled to compensation for damage caused to his riparian rights, or any breach of a restrictive covenant, or the emission of noxious fumes if the land is used for any purpose for which it could have been used had it been acquired under the Defence or Military Lands Acts, and (ii.) if the land is used for any other purpose he shall also be entitled to compensation for damage caused by such user; the compensation in either case, in default of agreement, to be decided in accordance with the provision of this Act. Provided that—

(a) The department shall have the right in manner provided by Section 3 of this Act to acquire land in respect of which a claim for injurious affection is made;

(b) The owner or person interested shall have the right to recover damages for injury to property caused by accident due to such user;

(*Continued on page 150.*)

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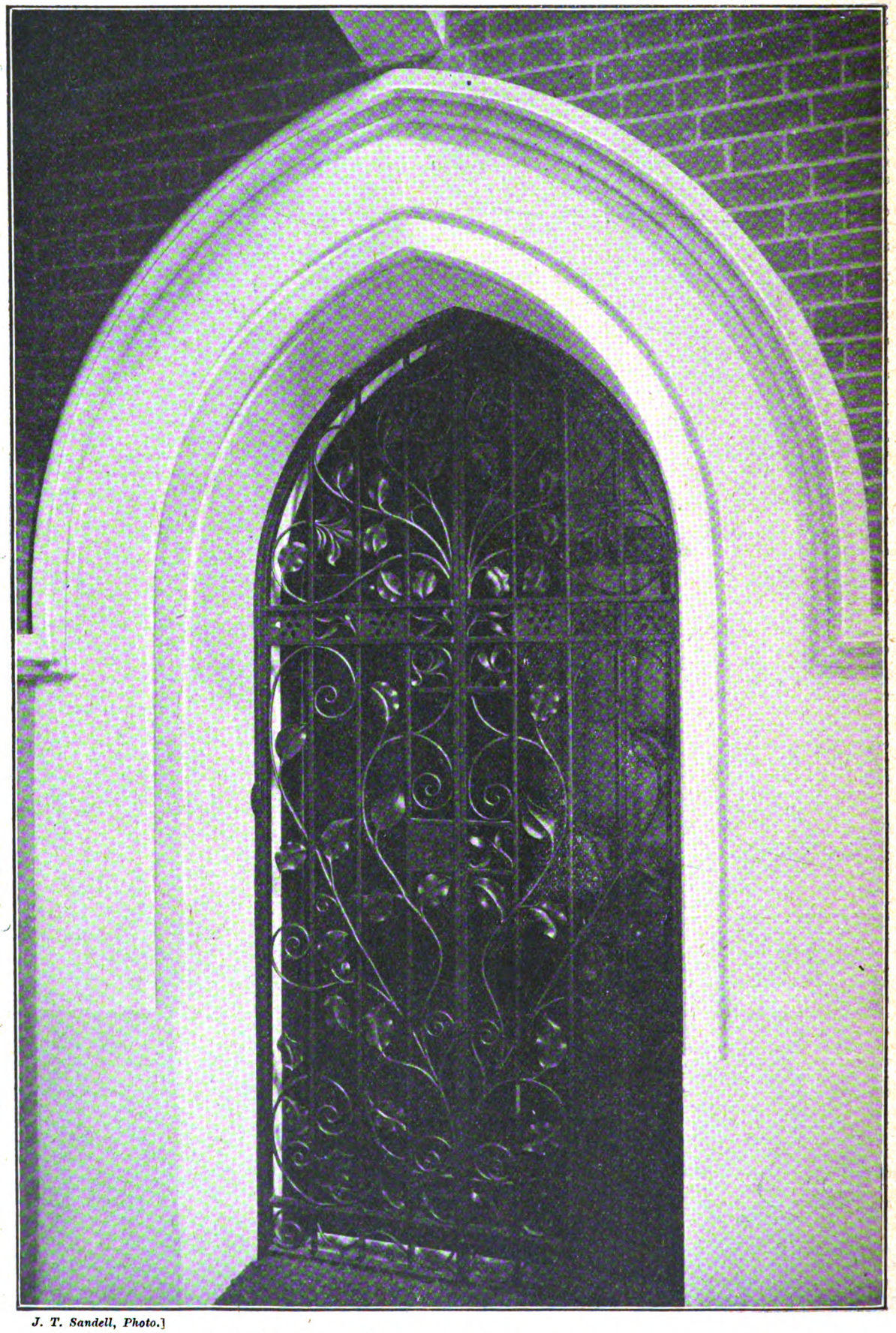

J. T. Sandell, Photo.]

A PAIR OF WROUGHT IRON GATES, ST. PETER'S, LONDON DOCKS, SHADWELL, E.—Mr. MAURICE B. ADAMS, F.R.I.B.A., Architect.

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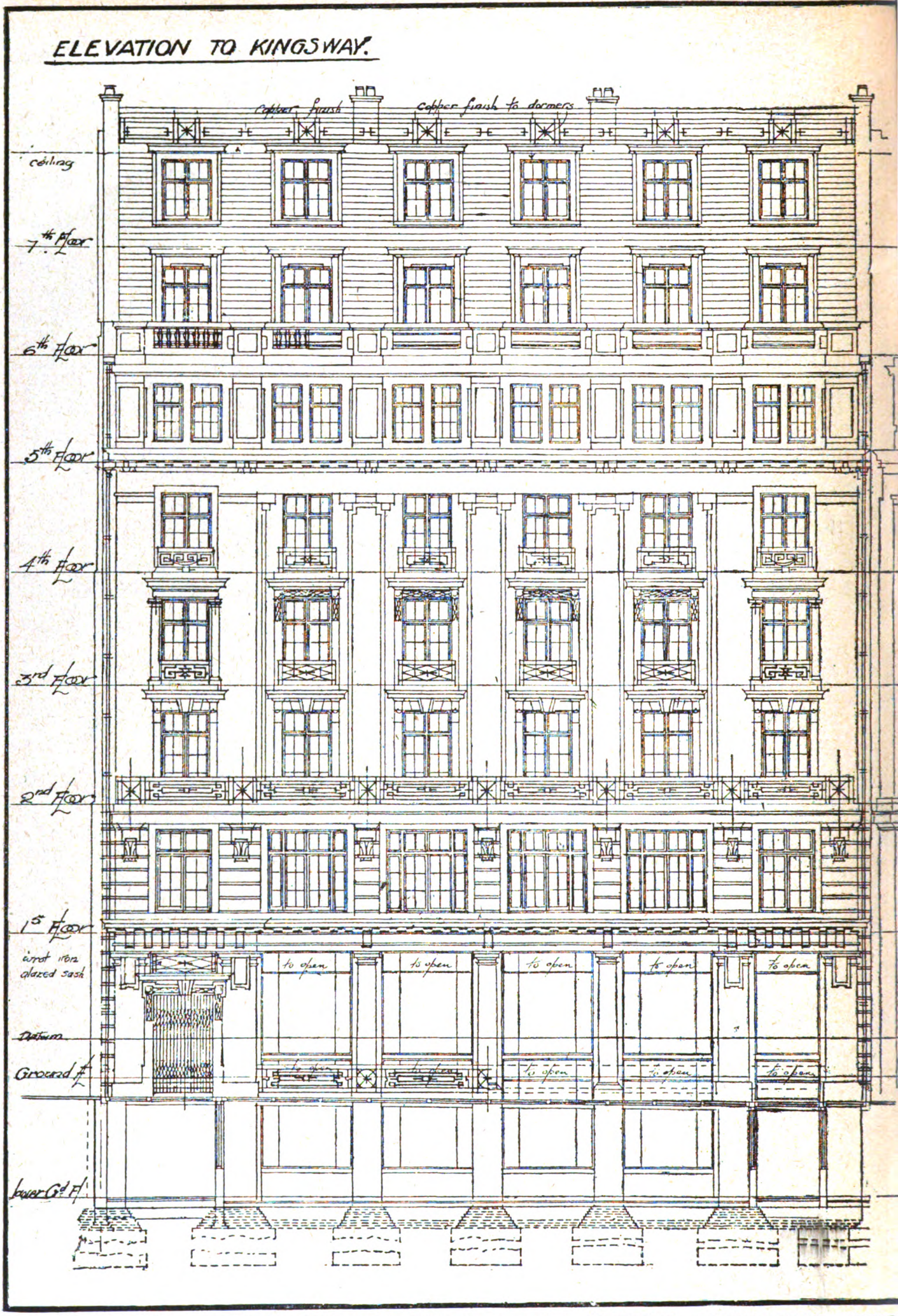

BLOCK OF NEW BUSINESS PREMISES NOW NEARING COMPLETION, KING

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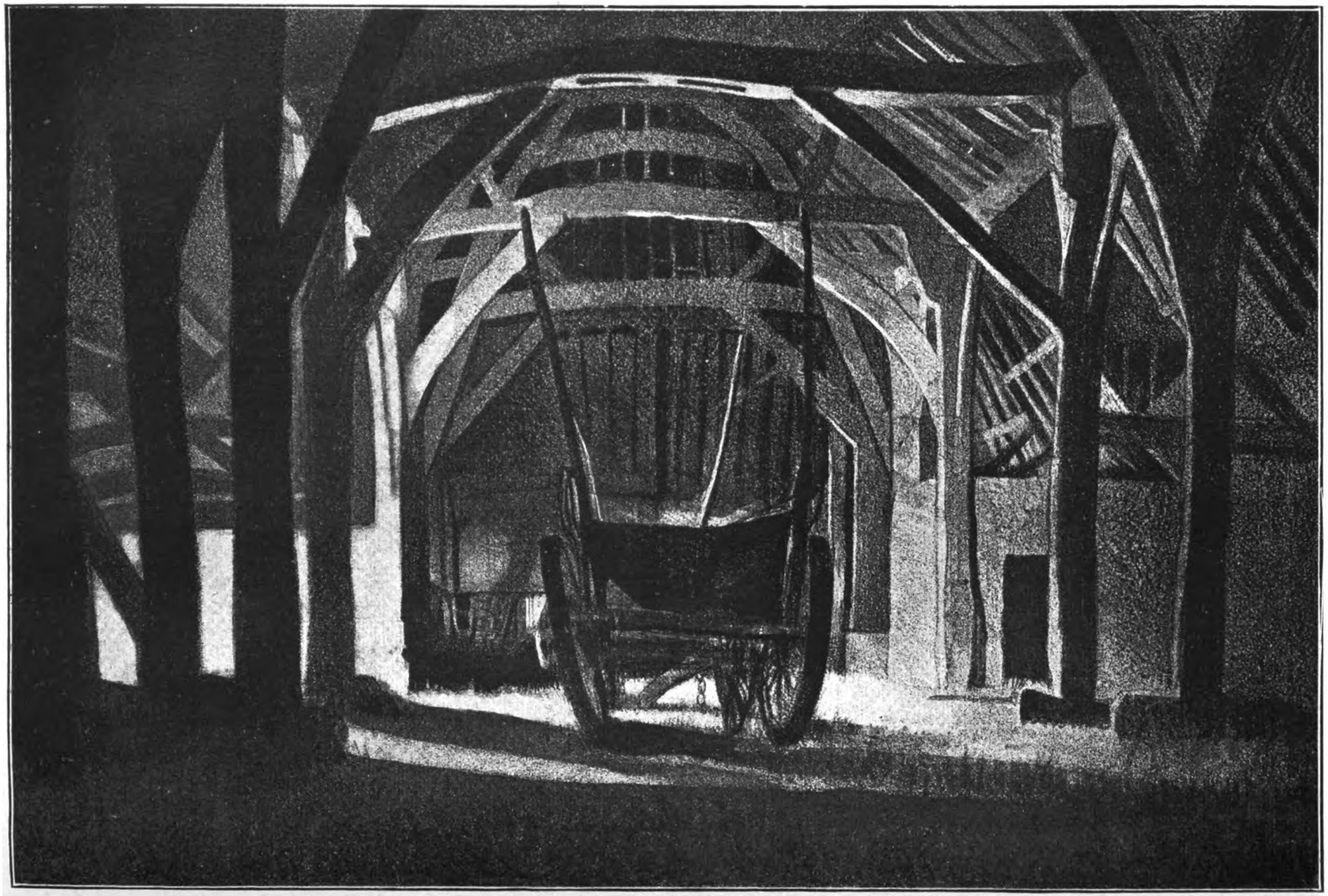

THE GRANGE GREAT BARN, ALCISTON, NEAR ALFRISTON, SUSSEX.
(Royal Academy Exhibition of Graphic Art).—From a Lithograph by Miss Dorothy F. Roberts.

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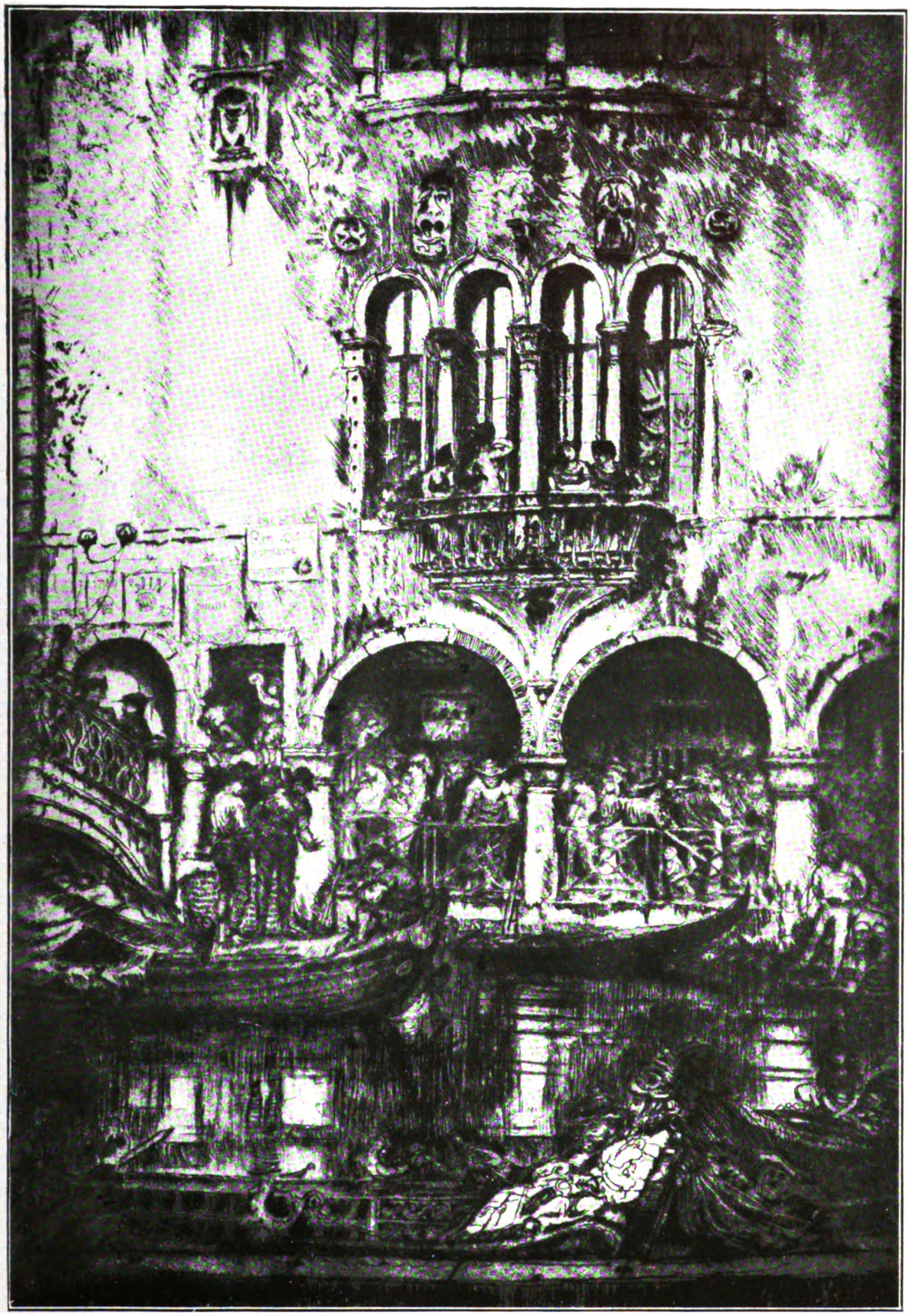

"THE DRESSMAKERS' BALCONY," NEAR THE GRAND CANAL, VENICE.
(The Royal Academy Exhibition of Graphic Art).—From an Etching by Mr. CLIFFORD ADDAMS.

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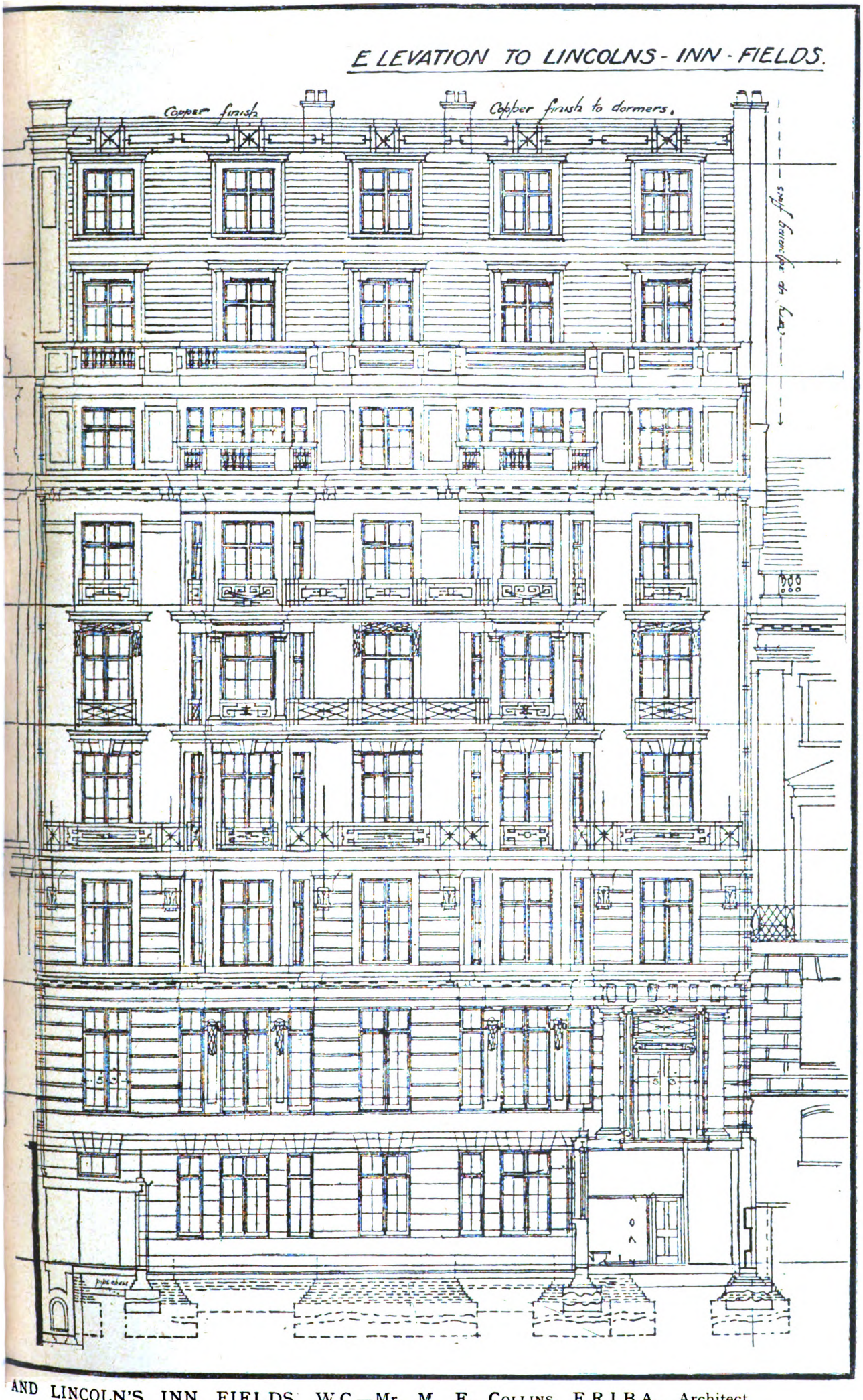

AND LINCOLN'S INN FIELDS, W.C.—Mr. M. E. COLLINS, F.R.I.B.A., Architect.

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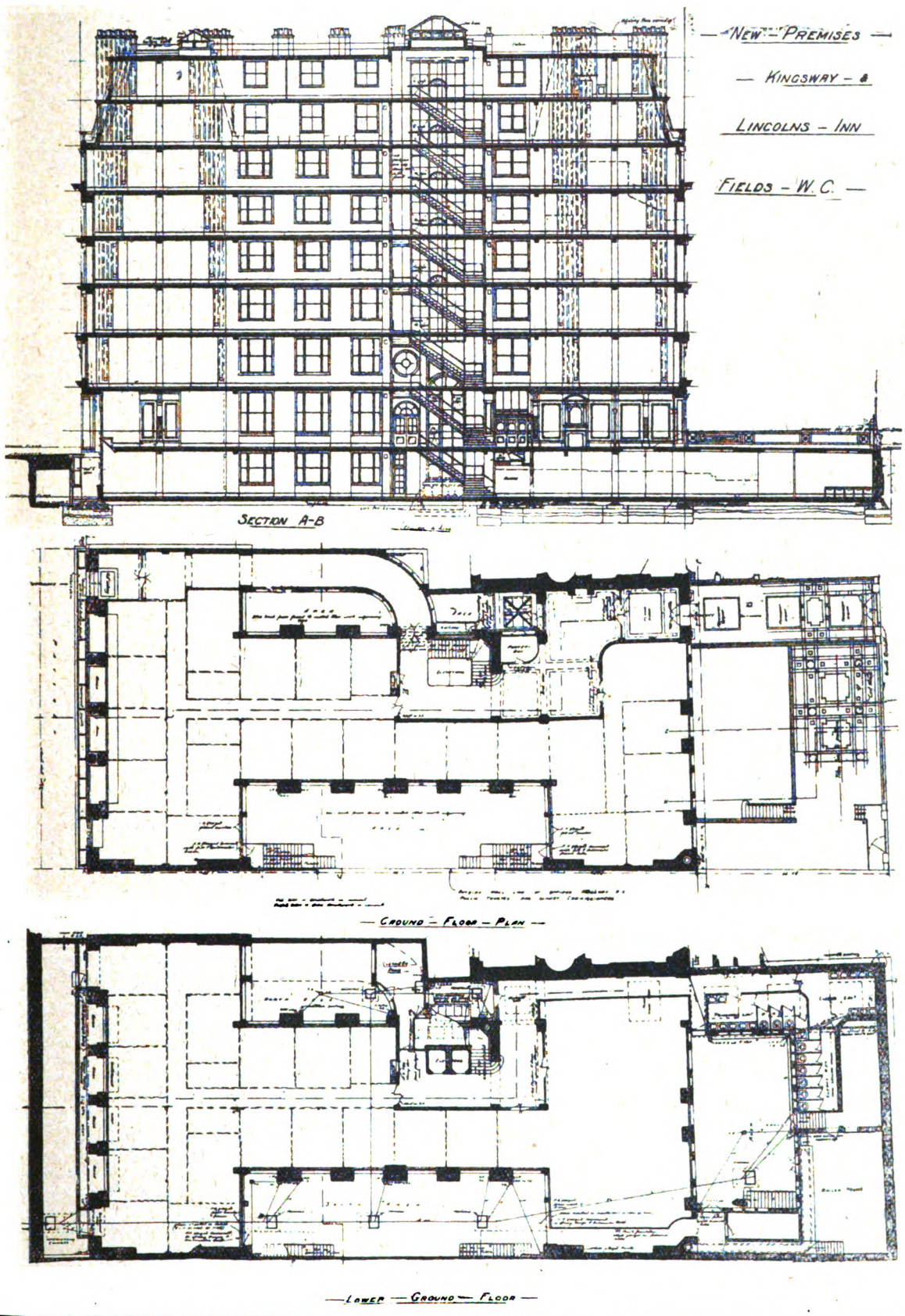

BLOCK OF NEW BUSINESS PREMISES NOW NEARING COMPLETION, KINGSWAY AND LINCOLN'S INN FIELDS, W.C.—Mr. M. E. Collins, F.R.I.B.A., Architect.

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Our Illustrations.

NEW BUSINESS PREMISES NOW NEARING COMPLETION, KINGSWAY AND LINCOLN'S INN FIELDS, W.C.

The two elevations, with two of the main plans and a cross section from west to east, herewith given, fairly well show the convenient character and architectural style of this important and extensive commercial building We have elected to give the lower ground floor plan to illustrate what may be done in the way of direct natural lighting to a basement, every available use being made of the open area towards the east on the Lincoln's Inn side. The conveniences are set below a paved and glazed terrace as well as side approaches from the pavement level, as shown by the ground plan. The main architectural lines of the façades were determined by those of the Land Registry Trustees' office on the Kingsway. The space is left unenclosed, and so set out on the several floors in order that tenants may have them cut up and allocated to meet individual requirements, flues being provided in the piers between the windows to permit fireplaces as desired, the dotted lines on the plans being merely a suggested way of dividing up for ordinary office use. Mr. M. E. Collins, F.R.I.B.A., of Old Broad Street, E.C., is the architect. Mr. C. Grey, of Shepherd's Bush, is the general contractor. Portland stone is employed for the facing masonry. The lifts were supplied by Messrs. Waygood-Otis, Ltd. "Kleine" flooring is used throughout, and Messrs. Hayward Bros., Ltd., did the heating. At an early date we shall give to a much larger scale elevational details of the interesting work of this Kingsway building, which is one of the most satisfactory in that thoroughfare.

THE DRESSMAKERS' BALCONY, NEAR THE GRAND CANAL, VENICE.

This reproduction is rather reduced from the original print, but our illustration gives a good idea of the excellence of Mr. Clifford Addams' etching, now on view in the Royal Academy Exhibition of Graphic Art. The beautiful arcade and elegantly corbelled balcony is capitally rendered, with a good sense of local colour. The Palazzo is situated on the first canal after passing the Rialto, going towards the station on the right, and quite near the Grand Canal. The building, which is of Renaissance character, belonged to a family of cardinals, whose hat may still be seen sculptured on stone shields, enriching the façade along the upper stages. Below the hat is carved a curious crane, but we have been unable to identify the name of the original owners of the building.

THE GRANGE GREAT BARN, ALCISTON, SUSSEX.

The accompanying interior view is reproduced from an excellent hand-produced lithograph exhibited at the Royal Academy, in the Winter Exhibition of Graphic Art, by Miss Dorothy F. Roberts, of South Street, Chelsea. It represents one of the largest timber barns in England, and the finest to be seen in the South Down county. Miss Roberts' drawing only shows half of it—or, rather, less than half of the entire building, which is ⅂ shaped on plan, possessing the grandeur almost of a cathedral or a big church. Certainly the structure is a splendid example of early carpentry, and a wonderful old place, well preserved, but little known and seldom mentioned, even in books on Sussex. Alciston, spelt in Domesday as "Alsitone" and in the vulgar tongue "Ashon," is in the Rape of Pevensey, distant seven miles from Lewes, and hard by the familiar little town of Alfriston, famous for its ancient "post and panel" vicarage and "The Star Inn," of which we gave a prize sketch by Miss Joan M. Drewer in THE BUILDING NEWS for October 3, 1913. A further sketch of the same street will be found in our issue for January 14, 1916. The manor of Alciston formed part of the endowment of Battle Abbey by William the Conqueror, and after Henry VIII. spoiled that conventual institution the property went to the Gages, and now belongs to their descendants. The principal grange to the great abbey at Battle was "Alciston Place." It contains some interesting architectural features, and is used as the estate residence. The church has a dovecote at the west end of the nave roof. The chancel has two piscinæ, and there are two bells dedicated to St. Agatha. Berwick is the nearest railway station, two miles off. The roof of the barn is covered with tiles, which are of a fine dark red colour. Bolton Abbey Barn is not so vast as that at Alciston, but it is a great piece of carpentry, and will be found illustrated by sections and details in THE BUILDING NEWS for November 13, 1900. Another timber barn at Layer Marney, drawn by Mr. Arnold Mitchell, F.R.I.B.A., as R.I.B.A. silver medal student, appeared in our issue for April 2, 1886. It has a very wide span. The stone-built barns of Glastonbury and Wells were illustrated by us April 7, 1905, and that at Doulting, sketched by Mr. Maurice B. Adams, was given on August 17, 1894.

A PAIR OF WROUGHT-IRON GATES, ST. PETER'S CHURCH, LONDON DOCKS, E.

This pair of wrought-iron gates occupies an archway between the intended narthex to the church and the memorial and groined baptistry, which was erected some time ago from the designs of the architect, Mr. Maurice B. Adams, F.R.I.B.A. The illustration is self-explanatory, and the work has been carried out by Messrs. Hart, Son, Peard and Co. from the architect's full-size details. The gates form a grille in the ordinary way, but when open give access to the baptistry without first going into the nave, to which it forms an adjunct, with a stone stairway leading to an intended western gallery when the proposed new west front is built.

OBITUARY.

Mr. John William Waterhouse, R.A., died at his house in St. John's Wood on Saturday, after a long illness, in his 68th year. His first picture exhibited at the Royal Academy was "Sleep and his half-brother Death," in 1874. He was elected an Associate in 1885, the year of one of his best known-paintings, the "St. Eulalia." "The Magic Circle," painted in 1886, which was purchased for £650 for the Chantrey Bequest Collection, and "The Lady of Shalott," which was exhibited at the Academy in 1888, were others of his most popular works. He became an R.A. in 1895. His painting, "Hylas and the Nymphs," shown at the Royal Academy in 1897, passed into the possession of the Corporation of Manchester, and by them was lent for exhibition in Glasgow in 1901 and at the Franco-British Exhibition seven years later. At other loan exhibitions in Whitechapel, Manchester, the City of London Guildhall, and at Earl's Court examples of his work have been on view from time to time. His wife several times exhibited paintings of floral subjects at the Royal Academy. ...

The contract for the erection of 1,000 houses for the Scottish National Housing Company, Ltd., at Rosyth has, it is learned, been let to Messrs. Holloway Brothers, Ltd., of London.

Mr. Thomas Ross Salmond, who died at Belfast on Saturday in his ninetieth year, was resident engineer to the Belfast Harbour Commissioners for twenty-one years, retiring on a pension in 1892.

At the Defence of the Realm Losses Commission in London, last Friday, a claim for £17,500 was made against the Home Grown Timber Committee for Lady Cawdor in respect of the timber on the Cawdor estate in Scotland commandeered by the Government. The committee did not oppose, and the Commission allowed the amount.

The Auctioneers and Estate Agents' Institute of the United Kingdom has established a War Assistance Bureau, which aims chiefly at assisting those members who are serving with H.M. Forces, but have been able to leave a responsible person in charge of their business. In these cases the Institute, through the Bureau, is obtaining the assistance of its members, wherever practicable, without charge.

SOME NOTES ON THE DEFENCE OF THE REALM (ACQUISITION OF LAND) ACT, 1916.

(*Continued from page 139.*)

(c) In the using of the land the provisions of the Alkali, etc., Works Regulation Act, 1906, and the Rivers Pollution Prevention Acts, 1876 and 1893, and of any local Act shall be complied with, and nothing in this section shall affect the powers conferred by any Act, whether public, general, or local, or any local authority, board of conservancy, or other public authority in respect of the prevention of the pollution of rivers or abatement of nuisances caused by smoke or noxious fumes.

This section gives very wide powers to the department as to user, while the limitations are slight. Under the Defence Act, 1842, the Government may do anything on the lands taken beneficial to the public services, except that land taken under compulsory powers may not be used for the barrack service or for the erection of any barracks thereon.

The Military Lands Act, 1892, gives owners and others an opportunity of being heard at a public local inquiry before the land is taken compulsorily, the purpose for which it is required being stated by the Government. It does not appear likely that these provisions would affect this section, because under it the land can be used for any purpose for which it could have been used "had it been acquired," etc., and not "were it about to be acquired." It seems clear that, apart from the rights of user given by the Defence Acts, and so authorised by this Act, any particular piece of land can only be used, after acquisition, for the purpose for which it was used during the war—that is to say, it cannot be used for any other purpose for which it might have been used when taken under the Defence of the Realm Acts, if that purpose is contrary to the Defence and Military Lands Acts.

User is further restricted by Section 13 (5), which provides that land cannot be acquired compulsorily without the consent of the Commissioners if it is required for purposes other than those for which it can be acquired under the Defence and Military Lands Acts.

Section 4, as already mentioned, limits the owners' rights to claim compensation for damage caused by any breach of a restrictive covenant, damage to riparian rights, and damage by noxious fumes, in the case of land used for such purposes as it could have been used for had it been acquired under the Defence and Military Lands Acts, but no provision appears to be made for compensating owners where the purpose for which the land is used carries with it clearance rights and restrictive rights. Much land has been affected by these rights during the war, as in the case of some seaside towns, where development has been seriously interfered with, and where, unless large numbers of defence works are to be abandoned after the war, very serious loss will apparently fall upon owners of property in those localities. There are, no doubt, other causes of damage to adjoining properties, such as vibration, for which owners would have the right of claim but for this clause.

Section 5.

Under this section the Government may at any time sell, lease, or otherwise dispose of the land acquired.

Subsection (2).—Protects the purchaser in matters connected with the title to the land, and makes provision for compensating an owner who establishes an interest in the land which has not been dealt with.

Subsection (3).—Gives the owner of land the right of pre-emption to any land upon which no permanent buildings have been erected, or which is not used in connection with any permanent buildings. In the event of the right of pre-emption being declined by the owner, the offer shall be made to the person or to the several persons whose

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lands immediately adjoin the land proposed to be sold.

Subsection (4).—Gives owners six weeks, after receiving the offer, to determine whether they will exercise their right of pre-emption or not, the right entirely ceasing at the end of that time.

Subsection (5).—In default of agreement between the Department and the owner, the price to be determined under the provisions of this Act.

Subsection (6).—The last three foregoing subsections apply to the leasing of land for a term exceeding 21 years, except where the land is leased for the purpose of its development in connection with any factory, building, camp, or other premises erected or established on land retained by the Government.

It is difficult to decide how much owners will benefit under this section, as so much depends upon buildings "of a permanent nature." It is easy to realise the Government's difficulty. There are, no doubt, many cases where buildings spread over the land of more than one owner, and the right of pre-emption, could not be given without sacrificing the value of the buildings, but no reason is apparent why an owner should not have been given the right of pre-emption where the complete set of buildings was wholly upon his land. It is probable that there may be some interesting cases on the question whether buildings are of a permanent nature, and whether land is being used in connection with permanent buildings. Much may be suffered with complacence from the State, but from individuals the position is entirely different. It is assumed that on all questions of user after sale or leasing the owner would be free to take action without consideration of the provisions of this Act.

It seems clear that under Subsection (5) of this section the price to be paid by the owner shall be governed by paragraph 6 of the Schedule without regard to any enhancement or depreciation attributable to any buildings, works, or improvements erected on the land or any neighbouring land for purposes connected with the present war. There will no doubt be cases where the value of the land has been enhanced or depreciated by buildings erected for purposes of the present war, and still more enhanced or depreciated by buildings which have been erected since. I envy arbitrators the knotty points they will have to solve in apportioning the blame or the praise to the war and post-war buildings.

Section 6.

Subsections (1) and (2).—These subsections deal with matters in connection with the interference with public highways by the laying of tram lines or pipes over and under them.

Subsection (3).—Where under powers conferred upon the military authorities any public highway has been closed, it may not remain closed after the expiration of twelve months after the termination of the war except with the consent of the Commission. The Commission, before giving a consent, shall hear the public authorities interested, "and any person interested in any land adjoining any highway so closed shall be entitled to. . . . compensation."

"So closed" seems to mean closed with the consent of the Commission, so that for the first twelve months after the war owners do not appear to have the right to claim compensation for damage to land affected by the closing. It is difficult to see any reason for this.

Subsection (5).—Provides that this section shall not override agreements under which a time is specified during which tramways, etc., may remain upon highways or roadways may be closed.

Section 7.

This section deals with water and lighting, and, under certain conditions, allows companies to continue to supply outside their areas. It is to be hoped that the Commission, unless there are very good reasons to the contrary, will allow the mains to remain, not only for the purpose of supplying the particular Government factory for which they were originally intended, but will also allow them to be tapped en route where they are of sufficient capacity.

The section is an extremely interesting one, but there is not room to deal with it in this Paper.

Section 8.

Under this section the method of arriving at the amount of compensation is laid down.

Subsection (1).—(a) If both parties agree within such time as may be allowed by the Commission, compensation shall be determined by a single arbitrator agreed by the parties.

(b) Within such time as may be allowed by the Commission, at the request of either party, compensation shall be determined by a referee selected by the Reference Committee from a panel appointed in the same way as under Part I. of the Finance (1909-10) Act, 1910. The referee's decision shall be final, subject to appeal to the Commission on any point of law.

(c) In any other case it shall be determined by the Commission.

These provisions are eminently satisfactory, and if the panel is selected with the care with which the panel under the Finance Act was chosen, nothing but good can result. It has given universal satisfaction, and I have never heard either its methods of conducting a case or the fairness of its findings criticised, and although many awards have been challenged on points of law in the Courts, the majority have been there upheld. In this Act, when an arbitrator is appointed under (a) there is an appeal to the Courts in the ordinary way, but where a referee is appointed under (b) the first appeal is to the Commission.

Subsection (2).—Where questions are referred to the Commission, the provision of the Railway and Canal Traffic Act, 1888, shall apply. The procedure under this Act is very similar to that under a Court of Law; there is no appeal from a decision of the Commission on a question of fact. The subsection provides that:—

(a) The Commission may call in for its assistance one or more specially qualified assessors;

(b) The Commission may hold a local inquiry, and may delegate its offices and powers in holding such local inquiry to any one of its members, or to any officer of the Commission, or to any person whom it may direct to hold the inquiry. The person directed to hold the inquiry shall report the result to the Commission. The provisions of the Railway and Canal Traffic Act, 1888, as regards appeals, shall not apply to these inquiries;

(c) The Commission may act by two of its members, one of whom shall be the judge;

(d) Deals with the question of costs, and gives the Commission discretion, subject to the provision of the Lands Clauses Acts as modified by this Act.

Section 9 provides for the payment of sums awarded to owners.

Section 10.

Gives considerable powers to Government departments, and this section is set out in full:—

"For the purposes of this Act a certificate by any "Government department

"(a) that possession has been taken of any land for purposes connected with the present war; or

"(b) that the department is in possession of such land or is the occupying department within the meaning of this Act; or

"(c) that any sums therein specified have been expended by the State in erecting, constructing, or making buildings, works, or improvements for purposes connected with the present war on, over, or under any land; or

"(d) that any such buildings, works, or improvements have been erected, constructed or made with the consent of the occupying department at the expense of a person not being a person interested in the land; or

"(e) that a railway or tramway has been laid along, across, over, or under a public highway, or that a public highway has been closed, in the exercise of any prerogative right of His Majesty, or any powers conferred by or under any enactment relating to the defence of the realm for purposes connected with the present war; or

"(f) that water, light, heat, or power has been supplied to any premises on the requisition or at the request of a government department for purposes connected with the present war

"shall be primâ facie evidence of the facts therein stated."

Section 11.

This section deals with streets, buildings, or works which are contrary to the provisions of local by-laws, and should be read carefully, particularly by those who have erected buildings at their own expense, of which the department has no power of removal (Section 2 [1]), or where the department does not remove buildings and the owner is entitled to compensation for their non-removal (Section 1 [3]), as under this section the public authority has power to order alterations to be carried out to make the buildings comply with the by-laws or to order their removal after such buildings have passed into private hands.

The owner has the right to appeal to the Local Government Board.

Section 12.

Subsection (1).—Defines "land" as set out on page 1 of this Paper.

Subsection (3).—Among other definitions states that the expression "building" includes machinery and plant fixed or attached to the building.

Subsection (5).—Provides that a competent naval or military authority, acting under the Acts relating to the Defence of the Realm, shall be deemed to be a Government department.

This last subsection is a very important one, and is likely to give rise to a good deal of dispute. Under Section 10 a certificate of any Government department that certain things have been done shall be primâ facie evidence that they have been done, and this Section 12 (5) states that a competent naval or military authority shall be deemed to be a Government department. Questions will no doubt arise whether acts done have been done by a competent naval or military authority as defined by Clause 62 of the Defence of the Realm Regulations, revised to December 31, 1916. Under that clause the competent authority must be, as regards the Navy, an officer not below the rank of lieutenant-commander, and, as regards the Army, an officer not below the rank of field officer.

On account of great emergency land has been taken in some cases in a very haphazard way. "Somebody" has stepped in and taken it, and it is sometimes extremely difficult to ascertain who that "somebody" was. The onus of proof that he was a competent naval or military authority appears to rest upon the department proceeding under this Act, and it must be assumed that the decision of this point will rest with the Commission. It is, therefore, to be hoped that the owner of the property affected will be able to give evidence before the Commission. It seems inevitable that the department in some cases will be likely to find itself in considerable difficulty.

Section 13 prevents a department taking powers under this Act to acquire any common, open space, or allotment, or, except by agreement, any part of a park, garden, pleasure ground, or home farm usually occupied with the mansion-house, provided that—

(a) The foregoing shall not affect the right to acquire the right to use and maintain cables, lines, or pipes which have been laid under such land. It should be noted that the word "under" is used, and not "under or over."

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(*b*) Neither shall it affect private lands before mentioned upon which buildings for the manufacture of munitions have been erected before the passing of this Act, and where the acquisition of such land is shown to the satisfaction of the Commission to be necessary from a national standpoint, but the owner may in this case require the department to take the whole of such property, including the mansion-house, if any, and the matter cannot proceed until a draft of the order made by the Commission for acquiring the land has been laid before each House of Parliament.

Under this section with regard to the acquisition of park lands, etc., the department appears to be entirely in the hands of the owner. It is not left to the Commission to decide whether it is reasonable for the owner to demand that the whole of such park, etc., shall be acquired in cases where the department has acquired power to take any part; but if the owner "so requires" the department is bound to take the whole. There will no doubt be cases in which there will be differences of opinion as to what lands form part of a park or home farm, and it is not clear whether owners will have an opportunity of voicing their opinions. Considerable care will have to be used by the department, or it may find that in acquiring a comparatively unimportant munition factory it has made itself liable for the purchase of a large area of land with perhaps a mansion in addition which it does not require.

SECTION 13.

Subsection (2).—Deals with lands belonging to local authorities, public companies, and charitable bodies, and prevents departments retaining possession for more than three months after the war without consent, and for more than three years with consent.

Subsection (3).—Provides that where possession of any land has been taken under an agreement which specifies the time at which it has to be given up, possession cannot be retained after that time without the consent of the person with whom the agreement was made.

Subsection (4).—Further prevents interference with agreements and provides that, except as regards an agreement for a tenancy, land cannot be compulsorily acquired where an agreement has been entered into that it shall be restored to the owner, and that the powers of a department for acquisition under this Act shall not interfere with an agreement for sale to a Government department.

Subsection (5).—Deals with user and has been referred to under Section 4.

SCHEDULE.

MODIFICATION OF THE LANDS CLAUSES ACTS

1. The department acquiring the land or interest therein shall be deemed to be the promoters of the undertaking, and this Act shall be deemed to be the special Act.

2. The provisions as to the sale of superfluous land and as to access to the special Act shall not apply.

3. All questions of disputed compensation shall be settled by an arbitrator, or referee, or the Commission, as the case may require (hereinafter referred to as "the arbitration tribunal").

4. No allowance shall be made on account of the acquisition being compulsory.

5. Where a portion only of any factory or other building is required, the owners and other persons interested in such building may, notwithstanding anything in the Lands Clauses Acts, be required to sell and convey the portions only of the building so required if the Commission are of opinion that such portions can be severed from the remainder of the properties without material detriment thereto, and in such case compensation shall be paid for the portions required, and for any damage suffered by the owners or other parties interested in the building by severance or otherwise.

6. In determining the amount of compensation, the value of the land acquired shall be taken to be the value which the land would have had at the date of the notice to treat if it had remained in the condition in which it was at the commencement of the present war, without regard to any enhancement or depreciation in the value which may be attributable directly or indirectly to any buildings, works, or improvements erected, constructed, or made on over, or under the land, or any adjoining or neighbouring land for purposes connected with the present war wholly or partly at the expense of the State, or, with the consent of the occupying department, at the expense of any person not being a person interested in the land:

Provided that—

(a) where any such building, work, or improvement was erected, constructed, or made in pursuance of an agreement with any person interested in the land, the consideration given by such person shall be taken into account in assessing the compensation payable in respect of such interest;

(b) where by virtue of an agreement with any Government department any person interested in the land is entitled as between himself and that department to the benefit of any such building, work, or improvement, the value attributable to such building, work, or improvement shall be taken into account in assessing the compensation payable in respect of such interest;

(c) where, since the commencement of the present war, any person interested in the land has himself erected, constructed, or made any building, work, or improvement, or has contributed to the expense thereof, or has committeed any act depreciating the value of the land, the value attributable to his expenditure or the depreciation in value attributable to such act shall be taken into account in assessing the compensation payable in respect of such interest.

7. In determining the amount of compensation, the arbitration tribunal shall also take into account the amount (if any) of any compensation paid or other payment received in respect of the previous occupation of the land so far as such compensation or payment was payable in respect of matters other than the mesne profits of the land.

8. Where the surface of the land is acquired without the mines and minerals lying thereunder, the provisions of sections seventy-seven to eighty-five of the Railways Clauses Consolidation Act, 1845, shall apply subject to this modification, that for the purpose of section seventy-eight of that Act "prescribed" shall mean "prescribed by the arbitration tribunal."

9. Where by reason of the erection, construction, or making of any such buildings, works, or improvements as aforesaid or the maintenance thereof, or by reason of the user of the land, any interest in the land has become or might become forfeited or liable to forfeiture, the compensation shall be determined as if no such forfeiture or liability to forfeiture had arisen or might arise.

10. The Lord Chancellor may make rules fixing a scale of costs to be applicable on an arbitration under this Act, and the arbitration tribunal may, notwithstanding anything in the Lands Clauses Acts, determine the amount of costs, and shall have power to disallow as costs in the arbitration the cost of any witness whom they consider to have been called unnecessarily, and any other costs which they consider to have been caused or incurred unnecessarily, and, if they think the circumstances such as to justify them in so doing, to order that such of the parties shall bear their own costs.

11. There may be contained in the award of the arbitration tribunal a finding that the claimant, after having been requested in writing by the department by whom the land or interest therein is to be acquired so to do, has failed to deliver to such department within a reasonable time a statement in writing of the amount claimed, together with any information in his possession which may be reasonably required to enable such department to make a proper offer, and, where such a finding is contained in the award, the provisions of the Lands Clauses Acts as to costs of arbitrations shall apply as if such department had offered the same sum or a greater sum than that found to be due by the award:

Provided that this provision shall not app unless the written request for information cont ed a notice of the effect of this provision.

12. The provisions of this Schedule shall apply to Scotland, subject to the following modifications:—

(a) For the reference to mesne profits there shall be substituted a reference to profits;

(b) For the reference to sections seventy-seven to eighty-five of the Railways Clauses Consolidation Act, 1845, there shall be substituted a reference to sections seventy to seventy-eight of the Railways Clauses Consolidation (Scotland) Act, 1845, and for the reference to section seventy-eight of the former Act there shall be substituted a reference to section seventy-one of the latter Act;

(c) "The Court of Session" and "Act of Sederunt" shall be substituted for "the Lord Chancellor" and "rules" respectively.

13. The provisions of this Schedule shall apply to Ireland, with the substitution of a reference to the Lord Chancellor of Ireland for the reference to the Lord Chancellor.

This schedule appears to be quite clear except perhaps paragraph 6 (c). In what way has the appreciation or depreciation caused to the value of the land, attributable to buildings erected by the owner or to his expenditure upon the land, to be taken into account? It must be assumed that he will be paid the value attributable to his improvements, and that depreciation caused by him will be ignored, as in that way only will he be dealt with fairly.

THE SURVEYORS' INSTITUTION.

The following candidates have satisfied the Examiners in the preliminary examination, 1917:—

Alldridge, Lionel George Helmore, 341, Dudley Road, Birmingham; Bax, Stephen Napier, Maperton Rectory, Wincanton; Beard, Edwin Ernest, Woodlands, Lexden Road, Colchester, Essex; Bickford, Sidney John, Woodbine Farm, Burnley, Lancs; Brailey, Leslie, 40, Pier Street, West Hoe, Plymouth; Crowley, Geoffrey Curtis, Chilbolton Rectory, Stockbridge, Hants; Daniels, Thomas Goldsworthy, 69, Derby Lane, Liverpool; Grange, George, Bridgehouse Gate, Pateley Bridge, Yorkshire; Greenslade, Arthur Thomas, Coombe, Thorneyville Road, Pomphlete, near Plymouth; Hanstock, John Walter, The Gables, Upper Batley, Yorks; Harris, John Hugh, Main Cottage, Privett Road, Alverstoke, Hants; Helmore, Leonard Mervyn, 3, Danes Road, Exeter; *Hill, William Archibald, 83, Upland Road, East Dulwich, S.E.; Horne, Edward Chancellor, 57, Hanworth Road, Hounslow, Middlesex; Jarman, Arthur Roy, Geneva Cottage, Cotterells Road, Hemel Hempsted, Herts; Johnson, Raymond Edgar, 28, Cowley Road, Uxbridge, Middlesex; Knapp, Douglas Eric John, Great Lyplatt, Corsham, Wilts; Marsh, Frank Barnett, 1, Dashwood Road, Stroud Green, N.; Matthews, Harold Marten, 9, Stone Buildings, Lincoln's Inn, W.C.; Pexton, Frederick William, 30, Tennyson Avenue, Scarborough; Prall, Hugh Alexander Mackie, 150, Eastgate, Rochester, Kent; Radclyffe, Brettoner, St. Briavels, S.O., Glos.; Rees, David Watkin, Bodlondeb, Penybank, Ammanford, S. Wales; Turner, George Edward, 34, Gravelly Hill, Birmingham; Vinson, Edward Douglas, The Old Vicarage, Loose, near Maidstone, Kent; Ward, Humphrey, Hewton, Bere Alston, Devon.

* Head of List.

CONCRETE AND REINFORCED CONCRETE.

(*Concluded from page 131.*)

APPENDIX.

SUGGESTED FORMULAS FOR REINFORCED CONCRETE CONSTRUCTION.

These formulas are based on the assumptions and principles given in the chapter on design.

1.—STANDARD NOTATION.

(*a*) **Rectangular beams.**

The following notation is recommended:—

f_s = tensile unit stress in steel;
f_c = compressive unit stress in concrete
E_s = modulus of elasticity of steel;
E_c = modulus of elasticity of concrete;
$n = \frac{E_s}{E_c}$;
M = moment of resistance, or bending moment in general;
A_s = steel area;
b = breadth of beam;
d = depth of beam to centre of steel;
k = ratio of depth of neutral axis to depth, d;
z = depth below top to resultant of the compressive stresses;
j = ratio of lever arm of resisting couple to depth, d;
$jd = d - z$ = arm of resisting couple;
p = steel ratio $\frac{A}{bd}$.

(*b*) **T-Beams.**

b = width of flange;
b' = width of stem;
t = thickness of flange.

(*c* Beams reinforced for Compression.

A' = area of compressive steel;
p' = steel ratio for compressive steel;
f_s' = compressive unit stress in steel;
C = total compressive stress in concrete;
C' = total compressive stress in steel;
d' = depth of centre of compressive steel;
z = depth to resultant of C and C'.

(*d*) **Shear, Bond and Web Reinforcement.**

V = total shear;
V' = total shear producing stress in reinforcement;
v = shearing unit stress;
u = bond stress per unit area of bar;
o = circumference or perimeter of bar;
Σo = sum of the perimeters of all bars;
T = total stress in single reinforcing member;
s = horizontal spacing of reinforcing members.

(*e*) **Columns.**

A = total net area;
A_s = area of longitudinal steel;
A_c = area of concrete;
P = total safe load.

2.—FORMULAS.

(*a*) **Rectangular Beams.**

Position of neutral axis,

$$k = \sqrt{2pn + (pn)^2} - pn \quad \ldots\ldots(1)$$

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Arm of resisting couple,

$$j = 1 - \tfrac{1}{3} k \quad \ldots\ldots\ldots\ldots (2)$$

[For f_s = 15 000 to 16 000 and f_c = 600 to 650, j may be taken at $\frac{7}{8}$.]

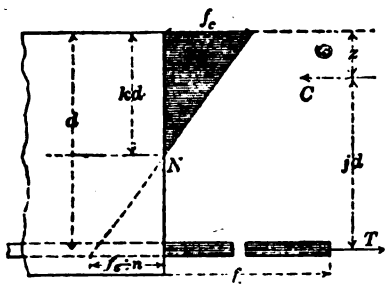

FIG. 3.

Fibre stresses,

$$f_s = \frac{M}{A_s j d} = \frac{M}{p j b d^2} \quad \ldots\ldots (3)$$

$$f_c = \frac{2M}{j k b d^2} = \frac{2 p f_s}{k} \quad \ldots\ldots (4)$$

Steel ratio, for balanced reinforcement,

$$p = \tfrac{1}{2} \frac{1}{\frac{f_s}{f_c}\left(\frac{f_s}{n f_c} + 1\right)} \quad \ldots\ldots (5)$$

(b) T-Beams.

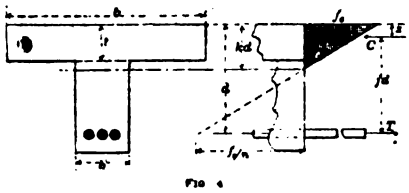

FIG. 4.

Case I. When the neutral axis lies in the flange use the formulas for rectangular beams.

Case II. When the neutral axis lies in the stem.

The following formulas neglect the compression in the stem :—

Position of neutral axis,

$$k d = \frac{2 n d A_s + b t^2}{2 n A_s + 2 b t} \quad \ldots\ldots (6)$$

Position of resultant compression,

$$z = \frac{3 k d - 2t}{2 k d - t} \cdot \frac{t}{3} \quad \ldots\ldots (7)$$

Arm of resisting couple,

$$j d = d - z \quad \ldots\ldots (8)$$

Fibre stresses,

$$f_s = \frac{M}{A_s j d} \quad \ldots\ldots (9)$$

$$f_c = \frac{M k d}{b t (k d - \frac{1}{2} t) j d} = \frac{f_s}{n} \cdot \frac{k}{1 - k} \quad \ldots (10)$$

(For approximate results, the formulas for rectangular beams may be used.)

The following formulas take into account the compression in the stem; they are recommended where the flange is small compared with the stem :

Position of neutral axis,

$$k d = \sqrt{\frac{2 n d A_s + (b - b') t^2}{b'} + \left(\frac{n A_s + (b - b') t}{b'}\right)^2} - \frac{n A_s + (b - b') t}{b'} \quad \ldots\ldots (11)$$

Position of resultant compressions.

$$z = \frac{(k d t^2 - \frac{2}{3} t^3) b + [(k d - t)^2 (t + \frac{1}{3}(k' d - t))] b'}{t(2 k d - t) b + (k d - t)^2 b'} \quad (12)$$

Arm of resisting couple,

$$j d = d - z \quad \ldots\ldots (13)$$

Fibre stresses,

$$f_s = \frac{M}{A_s j d} \quad \ldots\ldots (14)$$

$$f_c = \frac{2 M k d}{[(2 k d - t) b t + (k d - t)^2 b'] j d} \quad (15)$$

(c) Beams Reinforced for Compression.

Position of neutral axis,

$$k = \sqrt{2 n \left(p + p' \frac{d'}{d}\right) + n^2 (p + p')^2} - n p + p' \quad \ldots\ldots (16)$$

Position of resultant compression,

$$2 = \frac{\frac{1}{3} k^3 d + 3 p' n d' \left(k - \frac{d'}{d}\right)}{k^2 + 2 p' n \left(k - \frac{d'}{d}\right)} \quad \ldots\ldots (17)$$

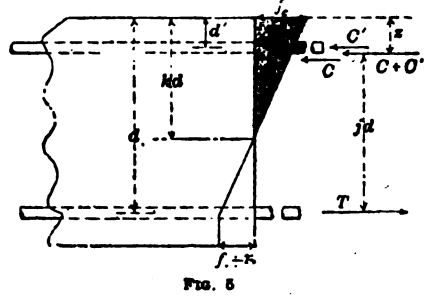

FIG. 5

Arm of resisting couple,

$$j d = d - z \quad \ldots\ldots (18)$$

Fibre stresses,

$$f_c = \frac{6M}{b d^2 \left[3k - k^2 + \frac{6 p' n}{k}\left(k - \frac{d'}{d}\right)\left(1 - \frac{d'}{d}\right)\right]} \quad (19)$$

$$f_s = \frac{M}{p j b d^2} n f_c \frac{1 - k}{k} \quad \ldots\ldots (20)$$

$$f'_s = n f_c \frac{k - \frac{d'}{d}}{k} \quad \ldots\ldots (21)$$

(d) Shear, Bond, and web reinforcement—

For rectangular beams,

$$v = \frac{V}{b j d} \quad \ldots\ldots (22)$$

$$u = \frac{V}{j d \,.\, \Sigma o} \quad \ldots\ldots (23)$$

[For approximate results j may be taken at $\frac{7}{8}$.]

The stresses in web reinforcement may be estimated by means of the following formulas :—

Vertical web reinforcement,

$$T = \frac{V's}{j d} \quad \ldots\ldots (24)$$

Bars bent up at angles between 20° and 45° with the horizontal and web members inclined at 45°,

$$T = \frac{3}{4} \frac{V's}{j d} \quad \ldots\ldots (25)$$

In the text of the report it is recommended that two-thirds of the external vertical shear (total shear) at any section be taken as the amount of total shear producing stress in the web reinforcement. V' therefore equals two-thirds of V.

The same formulas apply to beams reinforced for compression as regards shear and bond stress for tensile steel.

For T-Beams,

$$v = \frac{V}{b' j d} \quad \ldots\ldots (26)$$

$$u = \frac{V}{j d \,.\, \Sigma o} \quad \ldots\ldots (27)$$

[For approximate results j may be taken at $\frac{7}{8}$].

(e) Columns.

Total safe load,

$$P = f_c (A_c + n A_s) = f_c A (1 + (n - 1) p) \quad \ldots (28)$$

Unit stresses,

$$f_c = \frac{P}{A (1 + (n - 1) p)} \quad \ldots\ldots (29)$$

$$f_s = n \quad \ldots\ldots (30)$$

Mr. Samuel Stevens Hellyer, of New Holme, Bromley, Kent, has left £170,185.

It is notified in the *London Gazette* that the business of the Brimsdown Lamp Works, Ltd., Kingsway House, London, manufacturers of electrical lamps and fittings, is to be wound up under the Trading with the Enemy Amendment Act.

Mr. Reginald Barratt, R.W.S., died last week after an operation, aged fifty-five. He exhibited at the Royal Academy and the Royal Society of Painters in Water Colours, his paintings being chiefly of Oriental life and architecture, which he studied under Mr. Norman Shaw.

Correspondence.

WATERPROOFING CONCRETE.

To the Editor of THE BUILDING NEWS.

Sir,—On page 97, in a recent issue of your widely circulated journal, I notice in the course of your reproduction of the Report of the American Joint Committee a warning to engineers, architects, and builders against those waterproofing compounds which are injurious to the strength of the concrete, and which have no permanent effect upon permeability. The advice was good to ask manufacturers to produce "reliable data showing the action of the particular brand under a long time test."

As a member of the Concrete Institute I knew the importance of a time test, so that when I commenced to manufacture "Pudlo" I asked Messrs. Kirkaldy to test my product under compression. After a lapse of time, varying from three months to so long as two years, the cement showed no deterioration in strength but a slight gain. I also had compression and tension tests made by Messrs. Faija and Mr. H. C. Johnson, of Cork University. In addition to these I have had analytical tests made, and I shall be glad to send particulars to any reader of this paper if they will ask for the "Book of Tests."

With regard to the remarks about cement being waterproof in itself, I formerly had the same idea, so that I can quite understand anyone thinking that cement was waterproof without the addition of a waterproofing agent.

I will now try to show that the powder "Pudlo" has indeed a most wonderful chemical action upon cement. Just as a pinch of salt or a small quantity of sugar permeates food, so does this powder waterproof cement. What I say, perhaps, may not be so convincing as outside evidence, so if any reader will turn to the "Associated Portland Cement Manufacturers' Handbook" he will see on page 82 (the third edition, 1913), that "No concrete is absolutely impervious to water." When cement manufacturers publish such a statement one naturally feels that it is a reliable fact and an unbiassed opinion, because it is a cement manufacturer's constant aim to make his cement not only strong but impervious.

Many percolation tests have been made with "Pudloed" cement by some important experts. For instance, the University College, Cork, have engineering laboratories, and Mr. H. C. Johnson, their chief engineer, tested "Puldo" under an 8 ft. head of water. The slabs made without the powder allowed several ounces of water to pass in the short time of fifteen minutes, but the waterproofed slabs made with "Pudlo" passed no water, and indeed were perfectly dry, at the bottom of the slabs, after six hours. The engineer to the City of Winnipeg tested "Pudlo" with eleven other waterproofers, and "Pudlo" was the only one which withstood the test of 200 lbs. pressure. The Japanese Imperial Government tested the powder with German and American waterproofing compounds, and "Pudlo" proved to be the best. The above, with details, are in the "Book of Tests."

Since these tests were made the Spanish Government have made exhaustive and successful tests. The G.P.O. of the British Government has also made tests, with the result that this great public department specify "Pudlo" for waterproofing their manholes, etc. I should like to give half a pound of "Pudlo" free of any charge to any architect, clerk of works, builder, or builder's foreman who reads this paper if he will write to me. I will tell him how to make a test so that he can assure himself that this remarkable powder really waterproofs Portland cement. The same experiment is also a proof that Portland cement mortar and concrete is not absolutely waterproof in itself.

—Yours truly,

J. H. KERNER-GREENWOOD.

King's Lynn.

The housing difficulty at Chatham and Gillingham is as bad as ever, and rewards are offered of as much as £5 for the first information of empty houses.

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LEGAL INTELLIGENCE.

IMPORTANT BUSINESS POINT.—Before a Divisional Court of the King's Bench, on Tuesday week, composed of Justices Bailhache and Atkin, the appeal was heard of R. A. Naylor, Ltd., timber merchants, of Warrington, from a decision of Judge Howard Smith at Wolverhampton County Court in favour of plaintiff, Mr. William Roe, contractor, of Hartley Street, Wolverhampton, who had recovered judgment in an action brought for damages for alleged breach by R. A. Naylor, Ltd., of a contract of sale to the plaintiff of fourteen standards of timber, dated February 11, 1915.—Mr. Atkinson, K.C., for appellants, said that plaintiff gave the defendants an order, and received a contract note which had on it the condition, "Goods sold subject to their being on hand and at liberty when the order reaches the head office." Defendants told plaintiff that they could not deliver the first two items of the goods ordered as they had sold them elsewhere. Plaintiff, relying on the contract, sued and recovered judgment for £41 10s. for breach by defendants, the judge saying that he accepted the statement of plaintiff that he did not read the condition or the contract, but plaintiff did admit that he had previously had other contracts of the same kind from defendants. Mr. Atkinson argued that the judgment was erroneous, as plaintiff accepted the contract with the condition upon it, and he had actually sued upon it. The authorities said that, in the absence of fraud, a person was bound by the words on a contract, even if he did not read them. The County Court judge had taken the view that defendants did not take reasonable steps to call the attention of plaintiff to the condition on the contract, and he pointed out that it was printed in small type on neither the top nor the bottom of the document, and could only be read by turning it sideways. There was (counsel contended) no obligation on defendants to call plaintiff's attention to the conditions.—Mr. Hirst (for plaintiff) argued that the question was one of fact, and there had been no misdirection of law. What happened was that plaintiff was first shown certain specifications of timber, he selected certain items that he was told he could have, and then later came the contract note, which he found agreed with the items in the specification, and he did not see the condition on the note at all. The plaintiff had really been misled.—The hearing was adjourned till Friday, when judgment was given.—Mr. Justice Bailhache said that the condition was a very proper one, as where a firm had travellers they had to safeguard themselves against having the same goods sold two or three times over. The condition was generally recognised, and was known as "subject to goods being unsold." The law was that when one party handed to another a sold note which was accepted as containing the terms of the contract, there was no duty on the seller to ask the buyer to read the note or call his attention to the contents of the sold note. But a sold note could be a misleading document—the conditions might be misleading, because they are so ambiguously worded that they could be read equally well in two ways, or because they were so placed in the document that a man of ordinary care and intelligence on reading it would not expect to find the conditions in the position in which they were in fact placed. In such a case the buyer could not be bound by the clause or condition. The only question, therefore, in this particular case was, said his Lordship, whether the printed clause on the document was so printed that from its position, size of type, etc., an ordinary person, reading the document with proper care, might reasonably miss it? If in this case the buyer could show that he could not reasonably be expected to see the clause, he could not be held to be bound by it. There must be a new trial of the case for the judge to direct his mind to this point. If the judge found the plaintiff could say he was misled, then the contract note must be read as though the particular condition or clause relied on was not in the document.—Mr. Justice Atkin concurred.

RESERVOIR CONTRACT DISPUTE.—In the King's Bench Divisional Court, on Tuesday week, Justices Bailhache and Atkin had before them the case of Nott v. the Lord Mayor, etc., of Cardiff. This was a motion by the Cardiff Corporation to set aside an award of Mr. Ed. Sandeman, who acted as arbitrator in a contract dispute between the Corporation and the Executors of the late Mr. Louis Philip Nott. The contract related to the construction of a reservoir and subsidiary buildings at Taff Fawe Valley, Brecon. The contract price was over £200,000, and the dispute related principally to the question of "extras," the Corporation submitting that the findings of the arbitrator were not justified. After hearing full arguments, the Court dismissed the motion. Mr. Justice Bailhache added that he was quite satisfied that there was evidence supporting the findings of the arbitrator, and with regard to the engineer, his Lordship thought there was evidence given before the arbitrator upon which he might find as he did. The result was that this motion by the Corporation failed, and must be dismissed, with costs. Mr. Justice Atkin concurred.

PROFESSIONAL AND TRADE SOCIETIES.

NATIONAL FEDERATION OF BUILDING TRADE EMPLOYERS.—At the annual general meeting at the Connaught Rooms, W.C., on January 31, the president, Mr W. F. Wallis, in the chair, the Report was adopted. With reference to the revised forms of contract and sub-contract at present under consideration, the president stated that the form after reference to the Contract sub-committee would be sent on to the R.I.B.A., and, failing agreement, arbitration under the chairmanship of Sir George Askwith was suggested, as in the case of the Scottish form of contract. After other business the chairman moved, and Mr. Samuel Smethurst, J.P., seconded, that Mr. James Storrs, J.P. (Stalybridge), be president for the ensuing year. Mr. E. J. Brown (London) also supported the nomination, and Mr. Storrs was unanimously elected president. Mr. Storrs, thanking the meeting, said that it was thirty years since he first attended a National Federation meeting, and that he had had the honour of being president of the Lancashire Federation. Turning to the subject of the proposed new form of contract, Mr. Storrs said it was manifestly unfair that architects should be the sole arbitrators upon the question of materials to be used; disputes on such matters ought to go to arbitration. In conclusion, he moved a vote of thanks to Mr. Wallis for his able services as president during the past year, and suggested that his name be added to the list of vice-presidents. This was carried unanimously. Mr. W. F. Wallis said that his year of office had been a most strenuous one, and he had done his best to further the interests of the Federation. He tendered his hearty thanks to Mr. White and his assistant for their services during the past year, and Mr. White replied.

TRADE NOTES.

Boyle's latest patent "air-pump" ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct London, E.C., have been employed at Messrs. Liptons' Tea Rooms, 265, Oxford Street, London, W.C.

We hear the cellar under the Essex County High School, at Walthamstow, has given much trouble owing to being constantly flooded. After much expense in trying various means to keep the water away it was decided to put down a further 2 ft. of concrete, and to periodically use a wall pump. Water still percolated into the cellar, and the county architect then decided to use Pudlocd cement concrete. We understand this latter treatment has resulted in the cellar being made perfectly dry, and the authorities are pleased that the suggestion was placed before them.

The late Mr. Thomas William Offin, of High Street, Southend, auctioneer, left £32,010.

A birthday knighthood has been given to Mr. H. Holloway, Director of Housing Construction under the Ministry of Munitions, a member of the firm of Holloway Brothers, builders and contractors.

A striking illustration of the growth of an endowment is given by Mrs. Hylton Dale in a report of the doings during the past year of the Cult of London—an interesting little organisation designed to promote a love of London in its antiquarian and archæological aspects. In the year 1683 one Prisca Coborn left a sum of £50 a year for the foundation of a small school in the East End. The estate from which that sum was derived now produces a revenue of over £1,000 a year, and a still further increment is certain when the existing leases fall in!

Our Office Table.

The eighteenth edition of "Practical Sanitation," by George Reid, M.D., D.P.H. (London: Charles Griffin and Co., Ltd., 6s. net), is published. The matter has been completely revised and brought up to date. There are, perhaps, one or two sections in which a little more expansion would have been welcomed—notably those on ventilation and building appliances. The eight lines, for instance, on p. 185 on concrete hardly embrace all that should be known about the developments in the use of that material which have taken place since the first edition of the book was issued.

One of the really historic buildings in the United States is said to be the residence of the Governor of New Mexico in the city of Santa Fé. It is said to have been erected by the Spanish when the greater part of the Western world was theirs, and was the finest house in the colonies. According to legend, millions of dollars were spent on the quaint old structure. Most of the material in it was brought from Spain, and it was constructed by the best builders to be found among the Dons of that period. In the ship which brought over the building material and builders were many art treasures used to decorate the finished house. After the Spanish departed Mexicans used the house as a Governor's palace, and with the overthrow of the Mexicans by the United States Government it was continued as the residence of the head of the territorial Government that was formed. The house is still in use.

One of the most successful sales, from the standpoint of average realised, held by the American Art Association in New York took place in mid-January. A grand total of well over £100,000 was paid for 171 canvases by modern artists, the eighty-seven lots in the second day's session showing a total, within two hours or so, of $452,000. Alma-Tadema's "Thermæ Antonianæ," or "Baths of Caracalla," Opus CCCLVI., first seen at the Royal Academy of 1899, brought $19,000, or within about $5,000 of what the late Mr. James F. Sutton paid for it. The chief feature of the auction, however, was the $160,100 aggregate for twenty-four paintings by the French impressionist, Claude Monet, including $15,900 for a view of Bordighera, 26 ins. by 32 ins. Mr. Sutton is said to have paid an average of about $3,000 for his twenty-four Monets. A sunset landscape, on panel 30 ins. by 45 ins., by the American artist, George Innes, which cost the vendor, Mr. Edson Bradley, only $1,100 a few years ago, brought as much as $16,400.

It is reported that at a fire in the Prado Gallery, Madrid, on January 9, several famous paintings in that world-famed collection were destroyed. Chief among these appears to have been Titian's "Venus and Adonis." 73 ins. by 81 ins., painted in 1554 for Philip of Spain. It was, however, sadly disfigured by restoration, though no doubt originally a gorgeous piece of painting. In our National Gallery is a studio repetition of the Madrid picture, purchased with thirty-seven other works for £57,000 in 1824 from Mr. Angerstein. The National Gallery version was formerly in the Colonna Palace at Rome, and, according to Crowe and Cavalcaselle, is in all likelihood from the brush of Schiavone. Among other works destroyed by the fire are a portrait of the Duke of Richmond assigned to Van Dyck, "The Disciples at Emmaus," given to Velasquez, and Murillo's "Knight of Malta."

That glue or gelatine in drying will pull flakes off the surface of plate glass is well known to photographic process workers, so much so that they are careful to avoid such a mishap by previously rubbing over the glass with some substance of a greasy nature, such as French chalk. A case mentioned by a correspondent of *Engineering*:—A mirror with a frame of embroidery had been glazed with four pieces of plate glass mitred at the corners. The previous owner had stuck four pieces of Japanese leather-paper, about 5 by ½ in.,

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over the mitres to keep the dust out. After hanging in my very dry room for some time the paper began to peel off, and in doing so took flakes of glass with it. These flakes were shaped like oyster-shells, some of them more than a sixteenth in diameter. Anyone wishing to try the experiment should first clean the glass with caustic soda, and be careful not to finger it before pouring on the gelatine, i.e., the surface should be chemically clean. The glass must be thick or it will crack, and it should be *plate* glass, as the natural surface of crown glass might be too strong for the glue.

The Queen received at Buckingham Palace last Friday three deputations whose errands were closely allied, in that all concerned the maintenance of the beneficent work of the Star and Garter Hostel for disabled soldiers and sailors. One deputation represented the Auctioneers and Estate Agents' Institute, and its members came to offer to the Queen the title deeds of the Star and Garter property, together with those of Ancaster House near by, with a further contribution of over £13,000 to the endowment fund. In reply, her Majesty said:—"I am much touched by this proof of generosity on the part of the members of the Institute and of those who, through them, have contributed to the fund, and I am glad to think that the Star and Garter will always remain a permanent memorial of the patriotic spirit they have evinced in the relief and comfort of these brave men who have suffered so severely in the performance of their duty."

The war has brought a slump in company promoting in England and Wales. During 1915 only 3,749 new companies, with a capital of £49,284,267, were registered, compared with 6,871 in 1913, with a capital of £146,752,553. Some 164 companies went into liquidation, including 112 by order of the Court, and 2,993 were removed from the register on the ground that they were no longer carrying on business. In April, 1916, there were 66,094 companies on the register, with a capital of £2,716,989,129. Since 1862 156,373 companies have been registered, with a total capital of £8,032,953,787. By the 104 companies wound up by order of the Court creditors lost £645,982 and contributaries £1,654,221.

The long frost has seriously affected gas-meters as well as water-pipes. The temperature of the gas in the mains is 42 degs., and if in passing through the meter this is maintained the meter will be kept above freezing-point; but when no gas is passing through the meter becomes a dead end, and, not getting the benefit of the temperature of the gas, the water may become frozen. Therefore precaution should be taken to protect meters from the cold by covering them with bags or sacking. In the event of a meter freezing it should be thawed by the application of hot bricks or hot-water bottles placed around it and covered with thick wrapping. In no circumstances should a light be used to thaw a gas-meter.

Mr. Thomas Joseph Messom, of Holme Croft, Amyand Park, Twickenham, builder, has left £90,114.

The London County and Westminster Bank (Ltd.) have decided to open branches in Spain for the furtherance of trade between that country and Great Britain.

The Manchester City Council has accepted its gas committee's proposal temporarily to engage Mr. William Newbigging as consulting engineer to the committee, at a remuneration after the rate of £1,000 per annum.

A sub-committee of the Special Committee appointed by the Manchester Corporation to consider the question of relieving the congestion of traffic in the central parts of the city, reports in favour of constructing several new streets, and utilising a portion of the site of the old infirmary, Piccadilly, as a tramway centre and for municipal offices.

The "one thousand and second fact" about gas is that although the Gas Light and Coke Company is paying the same dividend, its chairman, Mr. John Miles, at the half-yearly meeting last Friday, told the shareholders it was certain that in the near future it would be necessary to increase the price. With the usual reduction in South London, where there is competition, we suppose?

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C., and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

***Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.

Telephone: Gerrard 1291.
Telegrams: "Timeserver, Estrand, London."

Received:—P. T. C. Co., Ltd.—M. R. and Co.—K. G. and Co.—H., Ltd.—R. I. C. and Co., L d.—F. McN. Co., Ltd.—B. O. Co., Ltd.—G. and Son.—M. and Co.—A. H. and Co.—J. D. and Son—C. W. H.—H. P. and Son.—S. H. B., Ltd.—A. W. C. H.—C. U. P.—M. P. Co., Ltd.—I. L. G. Co., Ltd.—L. C. C. S.—A., Ltd.—E. H. G.—K. F. and R.

B. H.—Yes.

T. R. S.—Thanks, no.

VOLENS.—Probably; when peace comes.

P. H. S.—Because in so many cases the demand is too small to test markets, and therefore sellers' quotations prevail.

SENEX.—Yes. While there is copyright in works of architecture, the 1911 Act expressly permits the photographing of architectural works.

CHIPS.

A new station at Markham village on the Sirhowy branch of the London and North-Western Railway was opened on the 1st inst.

No difficulty is anticipated in raising a thousand navvies, whom the Australian Government proposes to send to England for construction work in connection with the war.

Mr. F. Parker, of Boston, has been appointed county land agent to the Holland County Council in the place of Mr. E. J. A. Christie, who has joined the Colours. Mr. Parker is architect to the Lincolnshire County Asylum and a Fellow of the Society of Antiquaries.

In a time of war even the impossible may be cheerfully advocated. A local paper summarises the shortage of labour in the undertaking business by announcing that the only professional gravedigger at Rainham having joined up, the local undertakers have to dig their own graves!

The first important exhibition of the sculpture of Mr. Jacob Epstein will be opened on Saturday next at the Leicester Galleries, Leicester Square. Portraits of Lord Fisher, the Countess of Drogheda, Mr. W. H. Davies, Mr. Muirhead Bone, and other interesting personalities will be included in the collection.

The Engineer's Department of the Liverpool Corporation has contributed a total of about 1,400 men to the fighting forces. Of that number ninety have now laid down their lives. This gallant record was a matter of comment at the last meeting of the Health Committee, when the deaths in action of three of the engineer's former staff were regretfully reported.

At the last meeting of the Ellesmere Urban District Council, Mr. Brownlow R. C. Tower, the chairman, referred to the death of the late surveyor, Mr. J. Groom, who, he said, was a straightforward, honourable man, and a most conscientious servant. He proposed a vote of condolence with the widow. Several other members supported, and the motion was carried unanimously.

Under the will of Mr. John Elliot, Bidston, near Birkenhead, who died on December 31, it is understood that many pictures of the Liverpool School may find their way to the Walker Art Gallery, Liverpool, and other pictures to the Birkenhead Corporation Art Gallery. The testator was president of the Lear Home of Recovery, West Kirby, and he left to that institution £10,000 for endowment and not for building purposes, and a further £5,000 for building or general purposes.

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TENDERS.

***** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.**

CHELMSFORD.—For the construction of footpath and surface-water drain in Rectory Lane, for the corporation:—

W. and C. French	£141 16 6
H. Potter	129 15 10
F. J. French	115 15 11
B. H. Hale, Romford (accepted)	111 18 6

ENNISKILLEN.—For reconstruction of two houses in Darling Street, Enniskillen. Mr. J. Donnelly, 17, Darling Street, Enniskillen, architect:—

J. Donnelly and Son, Enniskillen	£830 17 0
J. Howey, Enniskillen	811 16 9
H. Pierce and Son, Enniskillen	787 10 0
J. Bloomfield, Brookeborough, co. Fermanagh (accepted)	724 10 0

HANWELL.—For fencing at the Children's Home at Hanwell, for the Metropolitan Asylums Board:—
C. H. Boyd and Son (accepted) .. £82

LEEDS.—Foundations, seatings, and flues at the new generating station, for the Corporation Electricity Committee:—
Airey and Son £2,600
(Recommended for acceptance.)

LEEDS.—For construction of a light railway between Leeds Fireclay Company's junction and existing light railway, for the corporation:—
C. Bushby and Sons (accepted) £1,550 10 0

LEEDS.—For supply of 18,000 tons of washed sand and 43,000 tons of gravel for concrete, for the corporation:—
Leeds Sand and Gravel Company, sand 3s. 6d. per ton, gravel 4s. 3d. per ton (accepted).

LONDON, S.E.—For supply of water-lifting pump, for the Woolwich Borough Council:—
J. Evans and Sons, Wolverhampton (accepted) £88 0 0

RAMSBOTTOM.—For laying 1,000 square yards, or thereabouts, of setts on concrete foundation, for the Ramsbottom Urban District Council. Mr. T. H. Bell, surveyor:—
T. Coates, 8, Shepherd Street, Bacup (accepted).

SIDMOUTH (DEVON).—For the construction of a sea wall and other contingent works in connection with the sea defences of Sidmouth, for the Sidmouth Urban District Council. Mr. S. Hutton, A.M.I.C.E.I., Public Hall, Exmouth, engineer:—
H. Pittard and Son, Langport, Somerset (accepted) £2,500

SLEAFORD.—Accepted tenders for supply of granite and slag for the whole of the roads in the district, and gravel for paths, for year ending February 28, 1918, for the Sleaford Rural District Council:—
2½-in. granite:—Gibson and Co., Sleaford, 14s. 6d.; Enderby and Stoney Stanton Granite Co., Ltd., Narborough, 14s. 8d.; Pattinson and Co., Ltd., Sleaford, 14s. 10d.; Whitwick Granite Co., Ltd., Whitwick, 14s. 10d.; Cliffe Hill Granite Co., Ltd., Markfield, 14s. 10d.; Charnwood Granite Co., Ltd., Charnwood, 15s. 3d.
Slag:—Stanton Ironworks, Ltd., Stanton, 6s. 9d.; Prestwick and Sons, Dronfield, 8s. 6d.; Holwell Iron Co., Ltd., Asfordby, 8s. 7d.; Pattinson and Co., Ltd., Sleaford, 8s. 9d.; Ellis and Everard, Ltd., Peterborough, 9s. 6d.; Lavender and Bateman, Sutton Bridge, 10s.

TRE THOMAS (MON.).—For the construction of about 100 lineal yards of concrete culvert and for road improvements at Tynywern Road, Tre Thomas, for the Bedwas and Machen Urban District Council. A. S. V. Taylor, Bedwas, surveyor:—

Robinson and Parry, Port Talbot	£892 19 6
W. Jones, Nelson	774 13 6
E. James, Ystrad Mynach	543 0 10
Williams Bros., Bedwas	513 19 2
P. Smith, Newport	495 7 8
W. Jenkins, Bedwas	481 0 6
E. Williams, Cardiff	444 17 0
J. Sutherland, Abercynon, Glam. (accepted)	439 0 4

WORTHING.—For the construction of beach cabins, for the town council:—
H. Tier, £6 5s. for one, £70 for 12.
F. Sandell and Sons, £6 and £70.
W. G. Benn, £5 3s. 6d. and £60 12s.
R. James, £4 12s. and £52 16s. (accepted for 12).

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COMPETITIONS OPEN.

March 3.—Water Supply and Sewerage Scheme (premium 5,000 pesetas—about £200), Manzanares, Spain.—Secretaria del Ayuntamiento, Manzanares.

LIST OF TENDERS OPEN.

BUILDINGS.

Feb. 23.—Certain Alterations to Nos. 5 and 6, Scrubbs Lane, in connection with fireproofing two front rooms of No. 6, to be used as an electric sub-station.—For the Hammersmith Borough Council.—L. Gordon, Town Clerk, Town Hall, Hammersmith.

Feb. 28.—New bathrooms, lavatories, etc., at the Louth County Infirmary.—J. W. Turner, J.P., Secretary, Louth County Infirmary.

March 1.—General Repairs, Painting, etc., to 37, Victoria Street, Norwich.—A. E. Collins, M.I.C.E., City Engineer, Guildhall, Norwich.

No date.—Erection of 33 pairs of Cottages near Holbeach Clough, Lincolnshire. Approximate distance from Holbeach Station, from three to five miles. The work is to be divided into sections of three pairs, and tenders may be submitted for one or more sections. Building to commence in April, and the work must be completed by end of September this year.—For the Board of Agriculture and Fisheries.—Secretary, Board of Agriculture and Fisheries, 4, Whitehall Place, London, S.W.

No date.—For Restoration of Wesleyan Chapel, Crowlas.—Messrs. Cowel and Drewitt, Architects, Penzance.

ENGINEERING.

Feb. 28.—Construction of two Masonry Dams across the Parbati River in respect of hydro-electric waterworks and irrigation schemes, amounting to about Rs.30,00,000, equal to £200,000 each; one near Budh, and the other between Bassai and Kaketo.—S. K. Gurtu, Member Board of Revenue for Irrigation, Gwalior Government, Moti-Mahal, Lashkar, Gwalior, Central India.

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

FENCES AND WALLS.

March 30.—Wrought-iron Gates and Fencing, for the Central Wharf and Quay Street Landing, Auckland, N.Z.—For the Harbour Board.—The Commercial Intelligence Department, 73, Basinghall Street, E.C.

PAINTING.

Feb. 24.—Repainting and Decorating St. Mary's Parish Church, Newry.—Designs and specification can be inspected at the office of Mr. S. W. Reside, Architect, Margaret Square, Newry. Tenders to be sent to the Rev. H. B. Swanzey, M.A., The Vicarage, Newry.

ROADS AND STREETS.

Feb. 15.—Supply and delivery in full truck loads, as required, to Newmarket and Burwell (G.E.R.) railway stations as follows:—Best broken Leicestershire granite, 1½ in., 2 in., 2½ in. gauge, about 1,000 tons; best broken slag, 2½ in. gauge, about 200 tons; granite or slag chippings, free from dust, ¾ in. gauge, about 500 tons; ¾ in. tarviated granite chippings, about 250 tons.—For the Newmarket Urban District Council.—E. R. Ennion, Acting Clerk to the Council, Deva Chambers, Newmarket.

Feb. 15.—Broken Roadstone, Tar Macadam, and Cob Limestone, to be delivered, carriage paid, to various railway stations, in quantities required by the surveyor (One Year).—For the Wetherby Rural District Council.—E. H. Coates, Clerk to the Council, Wetherby.

Feb. 17.—Supplying best Hand-picked and Broken Granite and Grouce at Cropredy, Broadmoor Bridge, Claydon, Banbury, Nell Bridge and Twyford Wharves, and at Banbury, Cropredy, Bloxham, Adderbury, and Hook Norton Railway Stations.—For the Banbury Rural District Council.—E. L. Fisher, Clerk, Union Offices, Banbury.

Feb. 17.—Leicestershire Granite and Granite Chippings; selected Ironstone Slag, free from comb; best Derby Limestone; Broken Pit or Dug Flints and best bright Pit Hoggin and Shingle; cartage of the above materials (One Year).—For the Kingsbury (Middlesex) Urban District Council.—H. H. Turner, Clerk, Council Offices, Kingsbury Road, Kingsbury.

Feb. 19.—Supply and delivery of Materials (One Year), viz., Lancashire and local Setts, Kerbs, and Channels; Portland Cement; Pitch and Creosote Oil; Granite and Limestone Macadam; Earthenware Pipes and Gullies; Lime; Brushes; Ironwork (street grates, manhole and lamphole covers); Leading Limestone, etc.—For Colne Highways and Sewerage Committee.—Chairman of the Highways and Sewerage Committee, Colne.

Feb. 19.—About 3,000 tons of Granite and 250 tons of best Blue Slag (broken), for repair of highways (One Year).—For the Southam Rural District Council.—C. W. E. Webb, Clerk, Market Hill, Southam.

Feb. 21.—Granite, Limestone, Slag, Basalt, Tarred Limestone, Tarred Slag, Refined Tar, Pitch, Kerb, Channel, Sand, and Stoneware Pipes (One Year).—For the Folsover Urban District Council.—J. F. Wardle, Town Surveyor, Council Offices, Bolsover.

Feb. 21.—Granite and Slag for the whole of the roads in the district and Gravel for paths.—For the Spalding Rural District Council.—H. S. Maples, Clerk, Spalding.

Feb. 22.—Granite and Slag (One Year), to be delivered at various stations and wharves in the district of Bridgnorth.—For the Rural District Council.—F. Richards, Surveyor, Bridgnorth.

Feb. 23.—Granite macadam and chippings; Macclesfield macadam and chippings; limestone macadam and chippings; 6-in. grit stone setts; sanitary pipes (One Year).—For the Marple Urban District Council.—D. J. Diver, Surveyor, Council Offices, Marple.

Feb. 24.—Granite Slag and Tarred Macadam, to be delivered at various railway stations in the district. Team labour necessary in carting the material on to the roads where required (One Year).—For the Rotherham Rural District Council.—Oxley and Coward, Clerks to the Council, 6, Westgate, Rotherham.

Feb. 26.—Setts, Macadam, and other road materials (Six Months).—For the Bredbury and Romiley Urban District Council.—A. Plunkett, Surveyor, Council Offices, School Brow, Romiley.

Feb. 26.—Granite Slag, Tarred Macadam and Limestone, delivered to the various stations and wharves in the district (One Year).—For the Keynsham Rural District Council.—F. G. Whittuck, Clerk to Council, Keynsham.

Feb. 28.—Macadam, Tar Macadam, Chippings, etc., delivered to railway stations and canal wharves in the county (One Year).—For the Cheshire County Council.—W. Holland, County Surveyor, The Castle, Chester.

March 1.—Road Materials (Channel Island Granite, Channel Island Granite Siftings, screened: Pea and Farnham Gravel, Kentish Flints, Cockle Shells, Red Pit Sand, screened Thames Sand and Kentish Rag) (One Year).—For the Commissioners of H.M. Works.—Secretary, H.M. Office of Works, Storey's Gate, London, S.W.

March 2.—Repair of District Roads (One Year).—For the Dorchester Rural District Council.—W. W. Reed, Clerk, 24, High West Street, Dorchester.

March 22.—Supply of about 2,980 yards of Flints, about 2,550 yards of Granite or other stone, and 60 yards of Gravel.—For the Chailey Rural District Council.—H. Kemp Walls, District Surveyor, North Common, Chailey.

STORES.

Feb. 19.—Supply of Roadstone and Setts; Kerbstone, Flags, etc.; Slag or Furnace Dross; Tarred Slag and Limestone; Pitch, Creosote Oil, and Refined Tar; Sand and Gravel; Drainage Pipes, etc.; Blue Channel Bricks; Bricks; Cement; Brooms; Paints; Picks and Shovels; Oils, Paraffin and Cotton Wastes; Disinfectants (One Year.)—For the Doncaster Corporation.—R. E. Ford, A.M.I.C.E., Acting Borough Surveyor, Mansion House, Doncaster.

Feb. 26.—About 60,000 Rectangular Sleepers, 9 ft. by 10 ins. by 5 ins., cut from Scotch or silver fir, delivered on the company's trucks at any stations on their system; 30,000 Sleeper Blocks, 9 ft. by 10 ins. by 10 ins. (contractor to specify description of timber), delivered on company's trucks at their stores department, Oriel Street, Dublin, within six months from date of acceptance.—For the Midland Great Western Railway of Ireland Company.—P. A. Hay, Secretary, Broadstone Station, Dublin.

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NEXT FOR DUTY.—Platoon Commander A. Gerard.

APPOINTMENT.—209 Sapper S. Foster to be Sec. Cdr., No. 1 Coy. (dated Feb. 8, 1917).

MONDAY, FEB. 19.—Technical for Platoon No. 9 at Regency Street. Squad and Platoon Drill, Platoon No. 10. Signalling Class. Recruits Drill, 6.30—8.

WEDNESDAY, FEB. 21.—Instructional Class, 6.15. Platoon Drill, Platoon No. 1.

THURSDAY, FEB. 22.—Platoon Drill, Platoon No. 7. Ambulance Class by M.O., 6.30.

FRIDAY, FEB. 23.—Technical for Platoon No. 10, Regency Street. Squad and Platoon Drill, No. 9. Signalling Class. Recruits Drill, 6.25—8.25.

SATURDAY, FEB. 24.—N.C.O.'s Class, 2.30, under Co. Cdr. Fleming.

ENTRENCHING.—Suspended till further Orders.

MUSKETRY.—For all Companies, see Notice at Headquarters.

NOTE.—Unless otherwise indicated, all Drills, etc., will take place at headquarters.

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By order,
MACLEOD YEARSLEY, Adjutant.

February 17, 1917.

Mr. S. S. Gottings, of Tring, has been appointed surveyor under the Dorking Town Council.

On February 3, at 3 p.m., the Bishop of Stepney dedicated and unveiled a stained glass window in St. Mary's church, Stoke Newington, N., given to the memory of the late Mr. William Eve, by his sons and daughters. The window was designed by Miss Margaret Chilton, of Westbury-upon-Trym, Bristol, and carried out by Messrs. Lowndes and Drury, of Parson's Green, S.W.

At White Chapel, Cleckheaton, a stained window is to be provided by the parishioners as a memorial of the vicar's two sons, Lieuts. C. S. Hyde and E. Hyde, both of whom have been killed in the war. Two other windows are to be given by the families of Capt. Charles Hirst and Lieut. Luke Mallinson Tetlow. The parishioners are also to provide for the building of a porch, in which is to be erected a memorial tablet to all those from the parish who have fallen or may fall.

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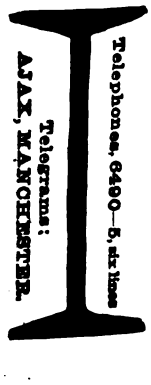

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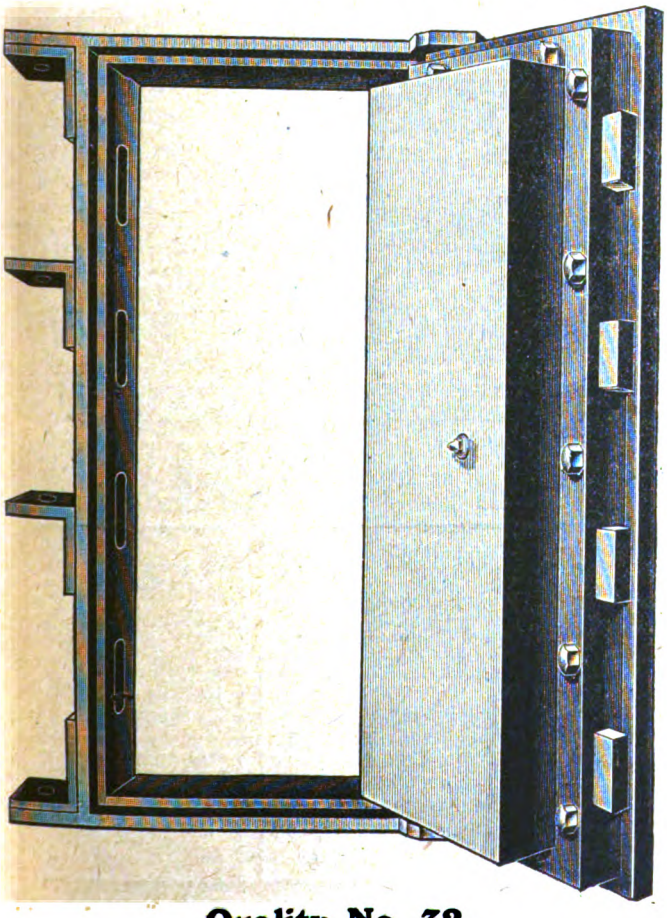

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February 21, 1917. Volume CXII.—No. 3242.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.

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OUR ILLUSTRATIONS.

The Bridge, Manresa, Spain. (Royal Academy Winter Exhibition of Graphic Art.) From an etching by Sir Ernest George, A.R.A.

Modern Architecture in India. Mangla Head Regulator Dam. Mr. John Begg, F.R.I.B.A., Architect. The Hospital and Dispensary, Mussoorie (view and plan). Mr. Frank Lishman, F.R.I.B.A., Architect. Postmaster-General's Offices at Lucknow. Mr. John Begg, F.R.I.B.A., Architect-in-Chief to the Government of India, Architect.

Public Washhouses for the Gorgie District of the City of Edinburgh at McLeod Street, Edinburgh. Plans, elevations, and sections. Mr. J. A. Williamson, A.R.I.B.A., City Architect, Edinburgh.

Currente Calamo.

Dr. Addison told the House of Commons on Monday night that further limitations of licences to builders were inevitable, even for small amounts. As regards the appointment of Sir Bampfylde Fuller as Chief Controller of Timber, recorded on another page, it would appear, according to a statement made by Mr. Montague L. Meyer to a *Daily Mail* reporter, that "his position remains the same."

We are glad to see the Board of Trade is to take control during the war of the canals and waterways of the United Kingdom. The curtailment of the railway service rendered necessary by the demand of the Army authorities for increased rolling stock, etc., has led to further pressure on the railway companies, and it is hoped to relieve this by utilising the canals. It is understood that an Executive Committee will be set up to regulate the various waterways. It will consist probably of representatives of the railway companies owning canals, and of the various privately owned canals. One of the first duties of this Committee will be to consider the traffic rates on the canals. It is hoped by this means to facilitate the distribution of food and the transport of munitions and raw material. We think that it will, although the action of railway companies in the past with reference to canals has not been such as to inspire much confidence in their representation on the proposed new Committee. If prompt action is meant, Mr. Neville Chamberlain is the man for the job.

We are reminded that M. Nenot, who is to receive the Royal Gold Medal, is the apostolic descendant of the famous coterie Messieurs Duc, Labrouste, and Duban, who in 1830 determined to extend the historic tradition of building in France. Another distinguished architect of the same school, M. Jean Louis Pascal, a few years ago received the same honour. As a young student of seventeen M. Nenot fought against the Germans in 1870, and received the French Military Medal. Seven years later he won the Grand Prix de Rome, and in 1895 he was elected a member of the French Institute. The care of the national palaces and civic buildings has been for some years in his charge. His most important work is the remodelling of the Sorbonne, originally built by Le Mercier in 1629. M. Nenot's scheme for the remodelling incorporated Le Mercier's Church of the Sorbonne as part of the plan arrangement. The chief feature of the new buildings is the Grand Amphitheatre, which is the most recent as well as the most complete development of the "D" plan for lecture theatres and halls of public assembly. M. Nenot is now sixty-four years of age, and his works are to be seen throughout France. It is one of the few consolations of the times, but a very cheering one, that we are able to associate his genius with the ties of friendship that bind the two countries in an alliance we all trust will prove inseparable.

The house famine in Birkenhead continues to engage the serious attention not only of those concerned in the search for dwellings, but of the local health authorities. Its natural sequel is overcrowding, with all that means in the way of insanitary conditions of life. A sinister connection between the local housing problem and the death-rate is suggested by the Registrar-General's returns for last week. Birkenhead is in the unenviable position of having a death-rate of 28 as compared with Liverpool's 23, and as compared with an average in the ninety-six great towns in England and Wales of 21.3 per 1,000 of the estimated population.

Contracts and contract notes are so common in all building business that parties concerned should be careful to see that they both read and understand them before dealing. The recent case of "Roe v. R. A. Naylor, Limited," reported in our last issue, is a good example of the trouble that may arise if such care is not taken. The plaintiff had seen defendants' traveller with price list and had ordered some timber of him. Then, later on, he called and left a printed contract note, which plaintiff glanced at but did not read. On this note there was, in small type, printed along the margin, so that it would have to be read sideways, "Goods sold subject to their being on hand and at liberty when the order reaches the head office." Plaintiff swore that he never saw or read this note, and that it was not pointed out to him. The defendants found they could not deliver two items of the goods as they had been sold elsewhere. Plaintiff sued them in the Wolverhampton County Court for breach of contract, and got judgment there for £41 10s. as damages. The judge held that the defendants had not taken reasonable steps to call the plaintiff's attention to the small-type condition on the contract. But on the defendants' appeal to the High Court the legal points were fully gone into. It was there held that the whole contract must be read, and that there was no obligation on the seller to draw the buyer's attention to its conditions. In short, this Court put the onus the other way by holding that it was for the plaintiff to prove that he was misled by the style in which the note was printed. The condition itself was reasonable and not at all unusual, especially in these war times. So the case goes back to the County Court for the judge to decide whether, as a fact, the plaintiff, as a man of business, could be fairly said to have been misled by the way the note was printed. The practical point resulting is that the first duty is upon the buyer to read the note upon which the sale is being made, and not that the seller is bound to draw his attention to any added and special condition.

Reference was made to the housing difficulty locally at the annual meeting of the Birmingham Incorporated Building Society, held at the Grand Hotel last week. The chairman stated that the past year had been a particularly trying one for building societies, and it would be found that the majority had very greatly restricted their advances, and had taken advantage of the high rates of interest afforded by Government securities and corporation mortgages. That society could have followed that course and made more profit, but the directors felt that the members would prefer them to continue the proper functions of a building society, and thus enable members to become their own landlords and to purchase properties for investment purposes. A noticeable feature of the year's operations was the unusually large number of advances made to members on houses for their own occupation; for with the dearth of houses and

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the growing number of would-be tenants many of their members had found that the only way to obtain a house to live in was to purchase it, as under the recently-passed Rents and Mortgages Act a landlord was allowed to give a tenant notice when he required the house for his own occupation. We have ourselves more than once drawn attention to this, and are convinced that house-building by small occupiers will be found their best investment for some years to come, and will materially increase work for builders when peace comes.

As here at home, there seems to be considerable opinion in India that more opportunities might be afforded to private enterprise in the erection of buildings. At the resumed sitting of the P.W.D. Committee of Inquiry on January 15 Mr. W. A. Chambers, F.R.I.B.A., architect and civil engineer, of Bombay, was examined. He expressed his opinion that private enterprise was not sufficiently encouraged at present, and it was desirable to entrust the construction of buildings to agencies other than departmental. The system of competition should be fostered among engineers or architects in regard to public buildings. Under that system private enterprise would be encouraged. Technical education in India should, he thought, be broadened. He said that a number of young men in Bombay were establishing themselves as architects, some of whom had been trained in England and had become Associates of the Royal Institute of British Architects. It was desirable that some of those young men, whose work was promising enough, should be sent on Government scholarships to undergo further training in Europe. Mr. G. T. Mawson, of Messrs. Marsland Price and Co., said he thought that the methods at present adopted for the execution of civil works were economical and suitable. Private enterprise was generally encouraged, but more support could be given. His firm had, after several attempts, failed to get a suitable type of engineer from the graduates turned out of the Poona Engineering College, and hence they had to go in for European engineers from England to design and supervise their works. The Hon. Mr. Pratt, Commissioner, Northern Division, Bombay Presidency, thought it was desirable to substitute private for departmental agency wherever possible, but he doubted whether it could be done successfully at present, except in a few cases in large towns and cities.

It is rumoured that the galleries of the Royal Institute of Painters in Water Colours have been inspected with a view to their being taken over by the Government. One hardly sees the need except to meet the remarkable fondness of the various Departments for palatial premises. As all arrangements have been made as usual for the forthcoming exhibition, and as painters have suffered more than most from the war, and have yet been self-sacrificing in their contributions for the benefit of war funds, it is to be hoped they will at least be allowed the chance of selling their pictures before they are turned adrift to seek another refuge—no easy thing to find even in normal times.

The War Savings Association in connection with Waygood-Otis, Limited, founded on August 2, 1916, has already collected for War Savings Certificates nearly £1,000. With a view to encouraging the employees of the company to make an extra effort, the company promised to buy outright, last week, at least one thousand War Certificates—if applied for on or before February 16—and paying the last shilling on each certificate. This offer met with a very encouraging response, and more than the thousand certificates were applied for. We congratulate the firm and the men. United effort of this sort is more really patriotic than much advertisement.

MODERN ARCHITECTURE IN INDIA.

WITH ILLUSTRATIONS.

The paramount claim upon financial co-operation throughout the Empire for the winning of the war in Europe has correspondingly restricted national expenditure in India as well as elsewhere. Consequently, much of the overdue contributions for building purposes under normal conditions have not been forthcoming in India during the past year. The Works Department Official Report for 1915-16, published in Calcutta, just lately to hand, emphasises this state of affairs. The review opens with the remark that "So peaceful a subject as civil architecture is apt to afford dull reading in war time." The official architects of the several Departments in India have experienced considerable difficulty in "carrying on" meanwhile. The architect-in-chief to the Government of India prefaces his general annual summary by expressing regret that he is unable to point out any definite progress as to the extent, spirit, or progress of architectural design and building in its application to current needs in the Indian Empire as evinced by executed works during the past twelve months. He considers that no case presents distinction of an eminent quality, seeing that not one building has attained "a definite high-water mark." Nevertheless, Mr. John Begg is careful to qualify this proviso by adding that he does not mean to imply that a general progress has not been maintained. For all that, those who examine this report will find it difficult to arrive at any other conclusion than that the work illustrated, taken as a whole, presents little continuity of aim by failing to display in what special direction architectural design in India has of late been tending. When the war is over, new conditions and new problems will, no doubt, be opened up for enterprise and fresh developments, but for the present, to speak frankly, the current work here represented seems to be too casually conceived, and mostly germinating towards a restless mediocrity. Some notable exceptions may readily be admitted, as in the case of the Mangla Head Regulator Dam, with which Mr. John Begg was architecturally associated. We give a photographic view of it to-day, accompanied by his remarks upon this undertaking, which ranks among the larger projects of the Irrigation Branch of the Public Works Department of the Dependency.

The Presidency of Bombay comprises most of the more important departmental public buildings carried out during the year. These are the new Port Trust Offices at Karachi and the new Science College built in Bombay. The Port offices furnish only an instalment of a much larger scheme, which includes the long-wanted Custom House. Both are stone buildings, and each of them was designed by Mr. G. Wittet, F.R.I.B.A. They are detailed "with all the serious intent and thoroughness which the material suggests." Illustrations appear in the report, so it is possible to form some opinion upon their evident merits. A similar job in point of scale is the same architect's Collector's Kacheri, Nawabshah, which is described by Mr. Begg as "aiming at strength and massiveness," the official recorder adding: "One trusts that the appearance in these respects is not belied by the construction." There can be no question about the solid-looking character of the work, which is a big structure largely handled. The façade is set out in four main pavilions, with porticos of Roman severity in style built in a barren, sandy district of Sind, for which locality it appears admirably appropriate. The plan consists of a central Dubar Hall with offices disposed in flanking parallel wings carried out in local bricks with dressed stone sparingly employed.

Mr. Begg, continuing, remarks in his preface that "more harm than good may be done in the cause of architectural progress by an undue pushing upwards of the standard of design and building"; and again we are reminded that "the zeal of the architect for his craft may, and sometimes does, outrun the discretion of his committee or other controlling authority, to the detriment of progress in the long run." Mr. Begg then mentions with approval the Massoorie Hospital, herewith illustrated, as an example that certainly does not err in this respect, for, as he says, "it is a very clever bit of design, eloquent of its suitability to its position." For this reason we have selected the subject among our choice for illustration, and with the view we include its plan.

The Lady Hardinge Medical College at Delhi, of which photographs and plans appear in the report, is remarkable for many points of well-considered detail, consistency of design, and good sound qualities which go far to make the buildings clever and original. They certainly may be described as well adapted to India. Mr. John Begg, F.R.I.B.A., is the architect His imposing block of offices for the Postmaster-General at Lucknow belong to a different class of buildings, as will be evident from our illustration of the main front; and, of course, its purposes obviously give it a monumental character. In the general survey of the year's work there are no particulars beyond the sparse reference to the completion of the work, also that some departures were made from his design in matters of detail in the principal elevation, which detract from its effect and caused the architect some regret, though on the whole his intentions were well realised. The cost was Rs.2,000,000. The reason given may account for the rather lumpy effect of the set-off between the tower and its turret stage bisecting a skyline, and which would have gained by being treated rather as one composition dominating the contour of the whole façade.

The other consulting architects furnishing supplementary contributions to the report are represented by many illustrations of their individual works. We have already named some of Mr. G. Wittet's chief designs. Mr. A. Crouch, F.R.I.B.A., of Bengal; Mr. Frank Lishman,

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F.R.I.B.A., of Agra; Mr. Joseph F. Munnings, F.R.I.B.A., of Bihar Presidency; and Mr. Basil M. Sullivan, A.R.I.B.A., of Punjab. Mr. Crouch was associated with Mr. John Begg in the Arts Building and Hostel at Jubbulpore, where they also built the Anglican church. All Saints' Church, Lucknow, and St. Peter's Church, at the same place, were designed by Mr. Begg with some success. Mr. Sullivan shares the honours with Mr. Begg for the Veterinary College, Lahore. The School of Tropical Medicine, Calcutta, and the general bungalow quarters for the Government officials at Dacca are entirely the work of Mr. Crouch, who likewise carried out the Decca College dining hall. Mr. Wittet's Kirachi Port Trust building, already incidentally mentioned above, is set out on a segmental flat curve on plan, and the façade is relieved by a cupola of pleasing proportions in the centre above the frontispiece, which dignifies the main entrance without undue ostentation.

The Mangla Head Regulator Dam was opened by the Viceroy in December, and has been finished some little time. Mr. John Begg tells us he is only partly satisfied with the result from an architectural point of view. Had he been enabled to share the counsels of the engineers earlier in the more initial stage of the project, he might have done more. For instance, he should have preferred to use fewer and larger vents for the sake of scale of the whole edifice, and it appears that this happens to have been a detail which might have been met without prejudice to the engineering aspects of the problem. The work had, however, proceeded too far before the consulting architect was called in to advise; consequently Mr. Begg was thus prevented from opening up the question. The lower part of this regulating dam, with the curved lines of the buttresses between the vents, looks very well. The upper part is not so happy, and would have looked better, he thinks, had it been treated in a bolder and simpler manner, all vertical lines perhaps being eliminated, and strong horizontal features introduced in contradistinction to the bottom formation of the building. The whole structure, however, is reported on as a fine, massive bit of masonry, in spite of the comparative smallness of the stones of which it is constructed.

The Hospital and Dispensary at Mussoorie is set on a rock, and has the advantage of an open, elevated, and picturesque site. Mr. Frank Lishman, F.R.I.B.A., consulting architect for the United Provinces of Agra and Oudh, is to be congratulated on this work, which has been alluded to already in this notice. The plan shows its arrangements. The undertaking cost, including outhouses and assistants' quarters, about Rs.59,000. The expense of the retaining walls amounted to a heavy item of Rs.15,500. The laying out of the footpaths and terraces, with their steps for the approaches, appear on the accompanying plan. The Dispensary for females is located at a lower level. The lay-out of the hospital is exceedingly simple, notwithstanding its V-shaped outline. All the contrivance is so clearly shown in our illustration that further description is not required. Among other works by Mr. Lishman mentioned in the report is the Judge's Court, Bulandshahr, which has been postponed waiting for the necessary allotment of funds, but the contract plans and estimates are ready, the contemplated outlay being stated at Rs.2.17.860. The High Court, Allahabad, is nearing completion, so much as Rs.13.09.000 having been spent up to the end of the previous financial year, ending March, 1916. The furniture for the court rooms was made by Chinese cabinet-makers or joiners, from the architect's designs, at a cost of Rs.9.500. The new courts at Cawnpore are soon to be built, the estimate being for Rs.11.61.950. Another building by Mr. Lishman is the combined office of the sanitary engineer and the consulting architect at Allahabad, which has been in occupation for about twelve months. The chief building cost Rs.81.395, or Rs.8.1.9 per foot super, and Rs.0.3.8 1-6 per cubic foot, as set out in the report. The outbuildings cost Rs.2.723. The stone employed came from Mirzapur, the external walls otherwise being finished with Kutni plaster. The roofs and floors are of "Kleine" hollow brick. The architectural treatment of this homely-looking building is broadly handled in an Italian Renaissance type of design, with simple lines and semicircular arches to the porch and verandahs to the lower stage, with columns dividing off the flanking openings to each bay, similar shafts being repeated above under the crowning cornice. Judging by the photograph, it makes a suitable and practical job, in conformity with climatic conditions, without being uninteresting, though rigidly plain. Many more pretentious Indian modern buildings never rise above the commonplace. Their cost bears little relation to their paucity in that respect.

The Allahabad University Library is conceived in an ornate manner after the Hindoo style, and may be said to be a well-balanced performance on regulation lines; but clever as it may be as an adaptation, the result is not distinctive or what is called "up to date." Col. Sir Swinton Jacob, K.C.I.E., was the architect. The work cost Rs.2.44.024, and its execution has been supervised by Rai Bahadur Hari Kishen Pant, executive engineer. The Post Office, Patna, has a fresher touch about it, is more free on broader principles, though European in idea—a plain building by Mr. J. F. Munnings, A.R.I.B.A., whose work shows promise, as in his types C and D for the bungalows he has erected at Patna. This report is well got up on good paper, but the photographs in all cases are not uniformly good, some being dull and lacking in light and shade. The publication is produced by the superintendent of the Government Printing Works at Calcutta.

A WAR-TIME SCULPTURE EXHIBITION.

The collection of Mr. Jacob Epstein's latest works now on view in the Leicester Galleries occupies the smaller room, which is draped in white, so that no colour shall militate or by any chance detract from the busts and figures arranged for study, though an element of uncertainty, apart from the character of the exhibits, is suggested by the note that the catalogue refigured in ink is under revision. Thus a plaster head of Mr. W. H. Davies, supposed to be in bronze, remains in plaster, the ultimate work not having arrived. No. 23.—The granite colossus, called "Mother and Child." is in embryo, so that before being informed it is easy to mistake the parent for the offspring. The whole thing, however, is marked "unfinished," but at present it would seem that the weakling facing the rock, in form like some wild South Sea god, is emerging from the mass of bolstered stone designated as "carving." The sole references to the war is a plaster sketch for a monument (No. 12), with French Zouaves scrambling along laden with their kit in front of a tenantless pedestal with which they seem in no way connected, while that part of the design is disorderly and incomplete.

The chef-d'œuvre of Mr. Epstein's winter show is No. 15, a nine-foot high white marble effigy, labelled "Venus," regardless of anatomy and devoid of beauty, though varied in idea, so that at a first glance its strange shape suggests oddly the figure-head of a ship, and then a faceless form emerging from a small argosy with an undue amount of rudder. This, however, is not so, because the sharp-edged knees and square-formed loins sink, as it were, by accident, into a robust rooster, with a hen whose head is buried in her breast, with her feet extending behind the boat-like form and shaped like those of a duck in the act of swimming. Hence our original mistake. We fail to follow the artist's conception, but the details, as well as the whole composition, baffle us. The design is not even Assyrian in austerity, while its sex is clearly marked, as in the Oscar Wilde tomb* set up in the cemetery Père La Chaise five years ago, but which the authorities subsequently covered up.

The best piece of work shown at Leicester Square is perhaps the bronze bust of Meum Lindsell-Stewart, No. 26; but the same subject with the tousled hair in plaster, No. 11, differs very much in facial form, and we can but presume that the bronze is a better portrait, though the other work is direct and naïve in its handling. Lieut. Muirhead Bone (24) suffers much at the hand of the modeller. "The Tin Hat," No. 7, shows a weary, strong man's head boldly treated in a powerful way, and cast in bronze, evidently the weird face "back from the trenches" is crushed by the basin-shaped helmet, and this is done intentionally with no sense of humour. The bust of Lord Fisher next to the last is perhaps worthy of being called a portrait, but the expression of the veteran War Lord, with the flat daub of hair brushed over the scalp, is not inspiring, but so charactered as to become a caricature.

LEAVES FROM THE LIFE OF THE LATE W. H. LYNN, R.H.A.

Sir Aston Webb contributes a very interesting paper to the R.I.B.A. Journal under the above title founded on "a simple scrap album lately presented to the Institute Library containing veritable scraps of illustrations and cuttings from the professional papers, photographs of executed buildings, letters and sketches all unmounted and without arrangement, and yet full of interest for architects who care to trace the career of an architect of genius as indicated in these scraps."

"W. H. Lynn," continues Sir Aston Webb, "was probably little known personally to this generation, but he left his mark on the architecture of his time. He was the greatest Irish architect of his century, and was not only an architect of distinction but a man of character and a notable citizen of Belfast, a city which was justly proud of him and one which we are told he 'seldom left except in obedience to professional duties.'"

"Lynn was one of the finest architectural draughtsmen of his day, but he used his gift mainly in so far as it helped him in his work, either in making strong pencil notes of old buildings that appealed to him, or in representing faithfully the probable effect of buildings he was designing.

Lynn was for some years a frequent attendant at the annual excursions of the Architectural Association; and he and F. C. Penrose were amongst the most indefatigable of the sketchers. Some of his drawings will be found in this album, notably the East end of St. Michael's, Coventry, a fine specimen of his uncompromising draughtsmanship. Others are the Vicar's Close, Wells; Woollas Hall and Huddington Court, Worcestershire, the two latter made during the 1881 excursion, when, as President of the Architectural Association, I had the pleasure to lead through the county as enthusiastic a party of students as could be found. I have a photograph group of them before me now showing Lynn and Penrose just as boys amongst boys, and none more keen or alert than they. On the last evening of the excursion it was usual to have a little show of the drawings made during the week, when those of Lynn and Penrose were amongst the principal attractions, though there were many other fine sketchers in the party.

Lynn was also a good sketcher in water-colours, but the album contains no specimen, as he probably laid less store for his purpose on this method of delineation. Penrose's

* See BUILDING NEWS, May 31, 1912, for photograph.

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sketches, on the other hand, were mainly washed drawings.

He was a great planner, and in his hands the most intricate buildings became symmetrical and dignified, easily understood by those who used them. Alfred Waterhouse, himself a great planner, once told me that there was nothing he would better like to do than to sit behind Lynn and look over his shoulder while he pinned an antiquarian sheet to his board and laid out a large plan. Perhaps one of his finest plans was that for the new Parliament House at Sydney, a Gothic design with a very fine symmetrical lay-out. This design was selected in open competition, but never executed. Another very fine conception was his third premiated design of the Glasgow Municipal Buildings, though I believe he himself preferred his Clarke Hall, Paisley, which he won in competition and carried out. He also won in competition and erected Town Halls at Chester and Barrow-in-Furness, both illustrated in the album.

The album contains a few illustrations from the many buildings he designed during his extensive private practice, which was of a singularly varied character. He designed some seventeen churches, mostly in Ireland, the Chateau at Quebec for Lord Dufferin, then Governor-General of Canada, the Campbell College, Belfast, together with many banks and other commercial buildings, and also many large houses.

Lynn, although incapable of seeking honours, appreciated them when they came to him, as is shown by his preservation of the notification of his election as Associate of the Royal Hibernian Academy, 1865, and as Full Member, 1872; as President of the Royal Institute of Architects of Ireland, 1885, and also the award to him of a Gold Medal at the Paris Exhibition of 1867 for his drawing of the Parliament Houses and Government Offices for Sydney.

Another interesting document preserved in the album is the following account: "W. H. Lynn to the Commissioners of Public Works. To salary for attendance as Clerk of Works at Queen's College, Belfast, from August to October, 1847, nine weeks at £3 a week." The young man of twenty acting as Clerk of Works at Queen's College, Belfast, made many of the drawings for this building, including an elevation of the West front, and finally became partner with the architect of the building, Sir Charles Lanyon, to whom he had been articled.

It may be asked "And is this album all the record of a great architect's work?" The answer, of course, is "Certainly not." The record of an architect's work is to be found in his buildings, be they many or few, large or small. His drawings are a means to an end and not the end itself. Lynn's buildings are the record of a life which as far as I know was, apart from his work, singularly uneventful. He was never married; he was a strong man and a true artist, firm of purpose, brooking no interference with his work, shunning publicity, and sincere and modest to a degree—such was the man of whom I have ventured to pen these few unworthy lines at the particular request of a mutual friend."

ASTON WEBB, R.A.

The surveyor has informed the Merthyr Corporation Public Works Committee that a start has been made in the demolishing of the old St. David's Schools, High Street, on the site of which will be erected new corporation offices and a public library.

The Municipal Council of Vienna decided at its last sitting, says a Berne message, to collect all the remaining church bells in the Austrian capital and to hand them over to the military authorities for military purposes. The number of bells thus collected is seventeen, with a total weight of about five tons.

Second-Lieutenant Leon Alfred O'Meara, East Lancashire Regiment (killed in action), was the only surviving child of Major W. O'Meara, late Royal Engineers, barrister-at-law of the Inner Temple, and of Mrs. O'Meara. Lieutenant O'Meara was educated at Cordwalles (Maidenhead), Rugby, and St. Edward's, Oxford. He had intended studying engineering at Cambridge, and was entered at Pembroke College. In January, 1916, when only 18½ years of age, he enlisted under the Derby scheme, and served in the Artists' Rifles and the Cadet Battalion. Last August he was gazetted to the East Lancashires.

HIGHWAYS AND BYWAYS.*

By LAWRENCE W. CHUBB,
Secretary to the Commons and Footpaths Preservation Society.

A public highway may be defined as a strip of land over which every subject of the King is lawfully entitled to pass. The extent of his rights is another matter. If he is merely entitled to passage on foot, the way is a highway for foot-passengers only; if he is entitled to ride a horse over a track, the way is a bridle-path or horseway, and a footpath as well. If carriages may lawfully be driven by the public over the way, it is a carriage road, and also a bridle-path and footpath.

The public right is confined to an easement of passage; it does not embrace the ownership of the soil, which, in most instances, remains vested in the adjoining owner or owners by whom, in normal cases, is owned the freehold to the centre of the metalled portion of the carriage-way. That is why the timber growing on the open wastes at the sides of roads belongs to the adjoining owners. So jealously do the Courts preserve the landowner's interests that it has been held that a man is not entitled to walk backwards and forwards along a public path over a Yorkshire moor in such a way as to interfere with a grouse drive (Harrison v. Duke of Rutland (1893), 1 Q.B. 142). In delivering judgment in this case, Lord Justice Lopes enunciated the legal principle involved. He said: "If a person uses the soil of the highway for any purposes other than that in respect of which the dedication was made and the easement acquired, he is a trespasser. The easement acquired by the public is a right to pass and repass at their pleasure for the purpose of legitimate travel, and the use of the soil for any other purpose, whether lawful or unlawful, is an infringement of the rights of the owner of the soil, who has, subject to this easement, precisely the same estate in the soil as he had previously to any easement being acquired by the public." In another case (Hickman v. Maisey (1900), 1 Q.B. 752) the defendant was held to be a trespasser because he walked backwards and forwards along a public carriage road in order to observe the form of horses under training on adjacent downland. In this case, however, Lord Justice Smith held out a crumb of comfort to the weary wayfarer, for he said: "If a man while using a highway for passage sat down for a time to rest himself by the side of the road, to call that a trespass would be unreasonable. Similarly, if a man took a sketch from the highway I should say that no reasonable person would treat that as an act of trespass." In another dispute (Fielden v. Cox (1906), 22 T.L.R. 411) the Court declined to grant an injunction to restrain persons from trespassing on a highway by using it for the purpose of catching moths by means of lamps and other appliances, on the ground that the trespasses were merely technical.

Nevertheless, the strict legal view is that a pedestrian is not entitled to a general right to stray over land not dedicated to the public use and enjoyment, although that land is unenclosed common or open down; and so accustomed are we to speak with pride of an Englishman's rights that it comes almost as a shock when we first realise that his most comprehensive right—a right of way—is confined within exceedingly narrow limits, and that it is possible that a man may be a trespasser upon a public highway.

Having thus considered the nature of a public highway, it becomes necessary to make some inquiry into the origin and history of such ways. Theoretically, every highway must have originated either by the operation of an Act of Parliament or by dedication—express or presumed—by some owner of the land over which it passes. Although, as we shall see, a number of carriage roads and fewer footpaths have been created by statutory authority, the vast majority are deemed to have come into existence by means of dedication. "Dedication" is the expression used to describe a convenient legal fiction devised to account for the existence of a public interest in highways.

* From a paper read at a meeting of the Royal Society of Arts, February 14.

When it is remembered that the antiquity of highways in general cannot be gainsaid, the doctrine of presumed dedication, and all that it involves, appears to the lay mind to be not far removed from the ridiculous. Some deeply-scored by-roads in use to-day probably existed as foot-paths and pack-ways in the time of the early Britons for the conveyance of tin and furs in pre-Roman days. Yet each of them is deemed to have originated in dedication.

The main Roman roads certainly extended for an aggregate distance of 2,500 miles, and some scholars of repute believe that their total length in Britain amounted, with their connections, to over 4,500 miles. When it is remembered that the flint, gravel, and other material required for the high causeways on which the roads were formed sometimes had to be carried for great distances, it is possible to realise something of the marvellous achievement of the Romans.

With the imposition of the rule of the Norman and the organisation of the manor as a unit of local government, the maintenance of the King's highway was imposed as a theoretical duty upon the lord of the manor and his tenants subject to the adjustment and control of the Court Leet. Wheeled traffic was almost unknown, save for the rough carts utilised to carry home the crops, and the customary highways were for centuries almost exclusively traversed by pedestrians and horsemen. Until the dawn of the nineteenth century the principal part of the corn in remote districts was conveyed to market by pack-horses, although in some places common carriers were prepared even in the fourteenth century to convey grain by cart at the rate of one penny per ton per mile.

The Statute of Winchester, passed in 1285, was the first Act of Parliament which purported to deal with roads. It did not go far, for it merely ordered that "highways leading from one market town to another shall be enlarged where as bushes, woods, or dykes be, so that there be neither dyke nor bush whereby a man may lurk to do hurt within 200 ft. of the one side and 200 ft. of the other side of the way." No attempt at actual maintenance of the surface of the highway was made, or was considered necessary, until the growth of vehicular traffic rendered repair an imperative necessity. If the way became foundrous or impassable, the traveller might deviate upon the adjoining land, even if cultivated, for the judges decided that it was "the good passage" that constituted the highway and not merely "the beaten track." Where the land on either side of a public way remains unenclosed this rule still obtains, and if fences are erected to separate the highway from the adjoining land the burden of repair, prima facie, still falls on the adjoining occupier, as long as his fences debar the public from their common law right of deviation.

It was not until 1555 that another Highways Act was passed (The Mending of Highways Act, 2 and 3 Philip and Mary, cap. 8), and this once and for all cast upon the inhabitants the obligation to maintain the highways in their parish. Surveyors of highways were ordered to be appointed by the parishioners, and were authorised and required to direct the performance of statute labour upon the roads. This was a form of National Service which no man might lawfully evade, but which imposed a burden from which all endeavoured to screen themselves. Nevertheless, roads became more neglected than ever, and were monopolised by large droves of cattle, sheep and pigs; even flocks of geese slowly tramped their way along the muddy ways from Norfolk to the markets of London. Many new highways, too, came into existence with the passage of thousands of Acts authorising the inclosure of commons. The awards made in pursuance of the Acts directed the setting out of convenient ways, but the question of repair remained unsolved. Turnpike trusts were therefore devised to remedy the deplorable state of neglect into which the King's highway had fallen. Certain individuals, with a view to the repair of particular roads, subscribed among themselves for that purpose, and erected gates

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upon the roads, taking tolls from those who passed through them.

The first scheme of this kind received the consent of Parliament in 1663, and dealt with ways in Herts, Cambs, and Hants. It was not, however, until 1706 that the first Turnpike Act proper was passed. This proved so successful that, altogether, over 1,100 turnpike trusts were created in England and Wales, having under their control 23,000 miles of road and enjoying and spending a gross annual revenue of £1,500,000. Each trust was empowered to construct and maintain a specified piece of road and to levy tolls for a limited period, usually twenty-one years. The powers were renewed from time to time, and Parliament further permitted the Surveyor of Turnpike Trusts to require the performance on the roads under his charge of the unpopular and personal obligation of Statute Duty and Team Labour first sanctioned in 1555.

The friction caused by the erection of turnpikes and the imposition of tolls led to much disorder, and culminated in the notorious Rebecca Riots in South Wales. In the meantime, general Acts were passed authorising the punishment by whipping and, in 1734, even by death of offenders who destroyed gates or toll-houses; but the state of friction continued until Parliament adopted a recommendation of a Select Committee of the House of Commons made in 1864, and finally declined to renew Turnpike Continuance Bills. The Highways and Locomotives Act, 1878, provided that such roads should become main roads, the expense of repair being jointly defrayed by quarter sessions and by grants from the Consolidated Funds. These roads are now under the care of the county councils.

It is greatly to be regretted that, by an obvious oversight, Parliament, when abolishing turnpike trusts, did not take steps to ensure that their records should be handed over to quarter sessions. It was enacted that the special powers of the trusts to abate encroachments should be continued; but the plans and records of the trusts, which were essential to prove the existence of such encroachments, remained with private individuals to whom they were useless. Such records have a definite historic value, and should be in the keeping of the county authorities. They throw much light upon economic problems of the eighteenth and nineteenth centuries, and are of considerable public interest and utility. County councils should therefore be empowered to acquire these records, on the ground that they concern all the main highways in the country, many of which have been public roads since their construction by the Romans.

Few of us, perhaps, realise the vast expenditure entailed in the upkeep of public roads in England and Wales. For the last normal year before the war it amounted to over ten and a-half million pounds—a sum which considerably exceeds the total revenue of Denmark. The burden of repair is increasing rapidly. Since 1907 it has grown by 11½ per cent. The total length of roads repaired by local authorities already amounts to not less than 151,112 miles, and if, and when, the recently proposed schemes of arterial road construction materialise, to meet the growing needs of speedy motor traffic, it is clear that the State will have to bear a considerable share of the financial burden.

It is now necessary to invite you to consider what is perhaps the most important and interesting aspect of the subject—the protection of public rights of way from obstruction. We have seen that once a highway has been dedicated to the public it can only be lawfully closed by Act of Parliament or justices' order. To obstruct it by any other means is unlawful, for the obstruction of a public way is a nuisance. We are all familiar with the maxim, "Once a highway always a highway," which is based on a decision that no length of time can legalise a public nuisance (Rex v. Cross, 3 Camp. 227).

Theoretically, therefore, a highway of any kind once created can never be lawfully closed by the irregular action of any individual. This principle has held good for generations, but prior to the reform of local government effected by the Local Government Acts 1888 and 1894, the burden of protecting rights of way was not obligatory upon a local authority, but mainly depended upon the voluntary efforts of the village Hampden. The power of the cumulative vote enabled one or two owners to disregard the needs and wishes of the inhabitants of an entire parish in vestry assembled.

For many years the Commons and Footpaths Preservation Society had found it necessary to include in its programme the work of preserving public rights of way, and the National Footpath Preservation Society, formed in 1884 by the late Mr. Henry Allnutt, also did much useful work.

In 1899 the National Footpaths Preservation Society was amalgamated with the Commons Preservation Society, and the work has so grown that, during the last twenty years, nearly 10,000 cases of obstruction of public roads, bridle-ways, and footpaths have been dealt with by the society. Relatively few of these cases have concerned public carriage roads. These highways are generally repaired at the public expense and, when that has happened, no question can arise as to the existence of a right of way. Only a small minority of footpaths, however, are repaired by the public, and disputes with regard to them are of frequent occurrence.

It is, therefore, fortunate that local authorities have far-reaching powers which, if wisely and fearlessly employed, render difficult, if not impossible, unlawful attempts to obstruct rights of way. The reasons for their inactivity are manifold. Sometimes they fear a lawsuit with its attendant expense, trouble, and uncertainty; or they may be composed of persons who have no sympathy with the public point of view. Again, in an even greater number of cases, they may be influenced by the fact that many of their members work for, or are tenants of, the landowner who is endeavouring to shut up a public path.

When a right of passage over a path which has hitherto been open is challenged, the first step which must be taken is to ascertain and marshal the facts both for and against the popular claim. A public path has certain definite characteristics. As a rule, it is provided with stiles, wicket, or other gates and footbridges; it is often a short cut, and it must be a thoroughfare leading from and to a place where the public has a right to be. Above all, it is desirable to be able to prove that the path has, in fact, been used for a long time as a public way by all who have desired to traverse it. Records, such as tithe or inclosure awards, sale plans, or ancient maps may be available to prove the antiquity of the way, although in view of recent decisions many maps are not admissible as evidence unless the surveyor by whom they were made can be produced to prove them.

Unfortunately, up to the present, Parliament has prescribed no fixed period of years of user for establishing a public as distinguished from a private right of way. The period varies in accordance with the views of particular judges, and with all the circumstances in connection with the formation, location, and history of the path. In one metropolitan case (North London Railway Company v. Islington Vestry (1872), Q.B. 37, J.P. 341), the brief period of eighteen months' user was deemed to be sufficient to support the presumption of dedication. In others, as we shall see, evidence stretching back as far as the oldest men can recollect has been held to be inadequate. It is, therefore, desirable to aim at securing evidence of forty or, if possible, of sixty years' duration.

Assuming that inquiry has proved satisfactory upon these points, and that no adverse evidence has come to light, it is fairly safe to conclude that the path in question is, *primâ facie*, a public right of way. But it must not be forgotten that, in the case of most ways which have been challenged, evidence of some sort is also available on the owner's side, and it is of extreme importance that this also should be ascertained.

The public should be on their guard against the unauthorised diversion of rights of way. It sometimes happens that diversions are effected without a magistrate's certificate. The new path is quite as convenient as the old, and no objection is raised to the change. But disputes have been decided against the public largely on this point, for it is argued that, since everyone is expected to know that certain elaborate formalities must be complied with before the line of a public path may be lawfully changed, acquiescence in an irregular diversion may be taken to indicate that the path was not a reputed public way.

It is not always safe for members of the public to take the law into their own hands by removing obstructions. In any event, it is imperative that they should be certain that the obstructed path is a public way, and that they should do no more damage than is actually necessary to secure reasonable passage.

The caging in of Stonehenge by means of a barbed wire fence and the charge of one shilling admission to the enclosure aroused violent opposition, for this famous circle of stones is recognised as the most imposing and interesting of all the prehistoric remains in England. For hundreds, if not for thousands, of years this early cathedral of the British race had been approached by deeply scored roadways which cross the Wiltshire Downs for long distances. It was alleged that the stones were suffering damage; but the Society pointed out that if that were the case it was open to the owner, while retaining all his proprietary interests in the monument, to constitute the Office of Works guardians of Stonehenge under the Ancient Monuments Act, and they would thereupon be bound to protect the remains.

It offered to raise £10,000 in order to purchase the owner's rights and to protect the stones without enclosure. This offer was declined, although, after first asking an enormous sum for his interests, the owner came down in price to £50,000. The Society felt that it would be neither right nor possible to raise this exorbitant amount, and with great regret Lord Eversley and the Committee eventually decided to institute legal proceedings against the owner, Sir Edmund Antrobus, who had obstructed the ancient tracks.

The hearing lasted seven days, and finally the judge decided against the Society's claims: in the first place, because the existence of a long-standing settlement was deemed to prevent the presumption of the dedication of through routes; and, in the second place, because, in his view, a public way could not end at a place of historic interest, such as Stonehenge.

This has been the only case in which the Society has suffered defeat in the Law Courts during a fifty years' fight for public rights of way, and the sympathy aroused by its efforts to maintain an important public principle has determined it not to rest content until this point, too, is finally settled by Parliament in accordance with the dictates of common sense and equity.

In the meantime the death of Sir Edmund Antrobus led last year to the sale of Stonehenge. The monument realised at public auction £6,600, or £3,400 less than the Society offered to raise in 1901 in order that the remains might be permanently preserved for the nation. Stonehenge is still in private hands, and the estate is considerably poorer than would have been the case had the Society's offer been accepted.

Litigation with regard to rights of way is an expensive matter. The Stonehenge case cost the Society almost £4,000; that amount, although large, is small in comparison with costs which followed a bitterly-contested action about Yorkshire footpaths, and which amounted to over £15,000. Heavy expense is unavoidable, because a host of witnesses must be produced on each side, and also because the cost of investigating ancient titles is often considerable. By simplifying the law, and laying down fixed rules for the guidance of judges and counsel, the Society's Public Rights of Way Bill will greatly reduce the burden of expense in connection with footpath litigation.

Last week at a meeting at Rhyl, presided over by Lord Kenyon, it was resolved that the erection of the new Science Buildings at Bangor University shall be the North Wales Memorial for Fallen Men in the War. Lord Kenyon was appointed chairman, and it was stated that the King and the Prime Minister approved of the scheme, which will cost £150,000.

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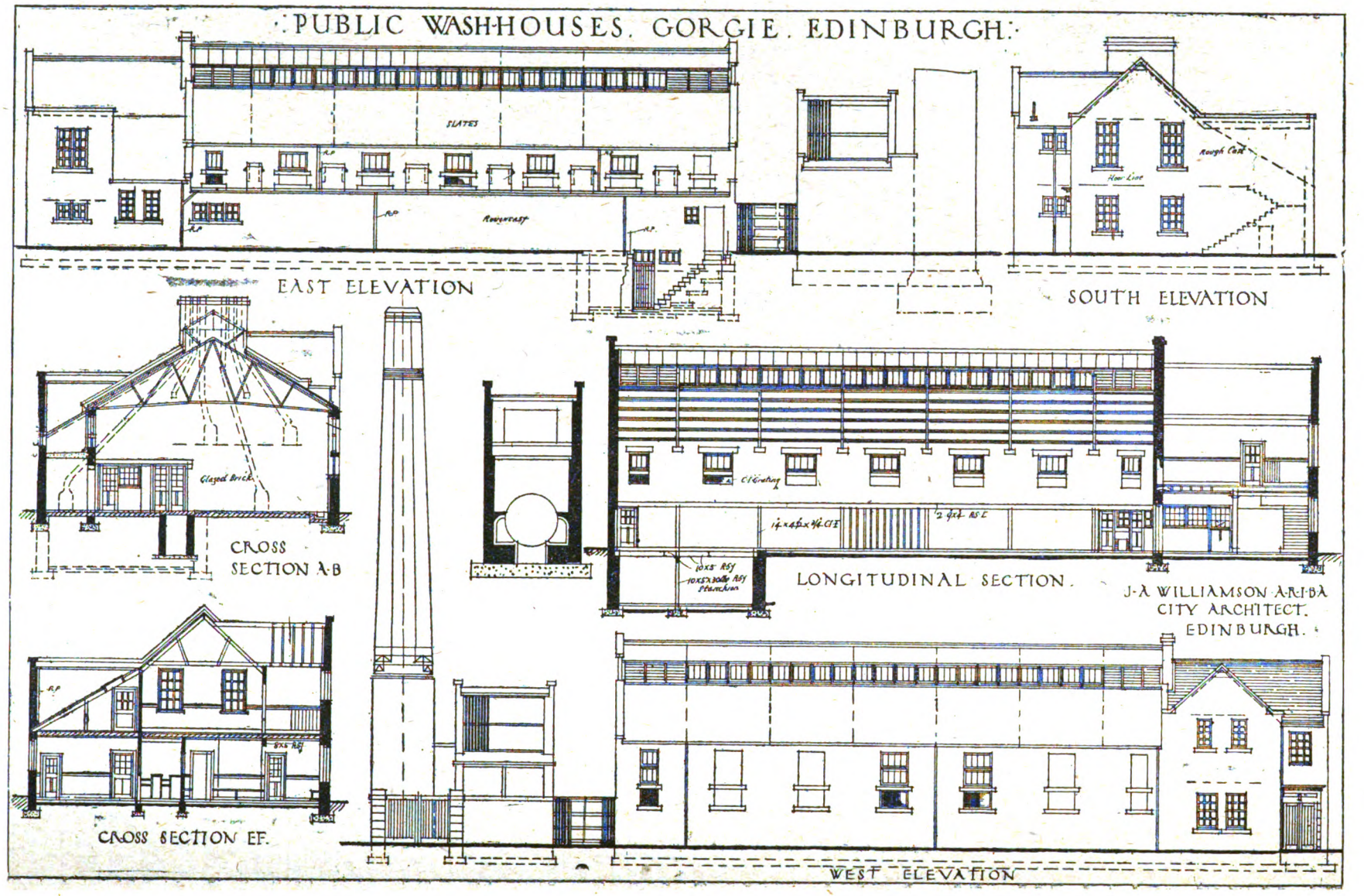

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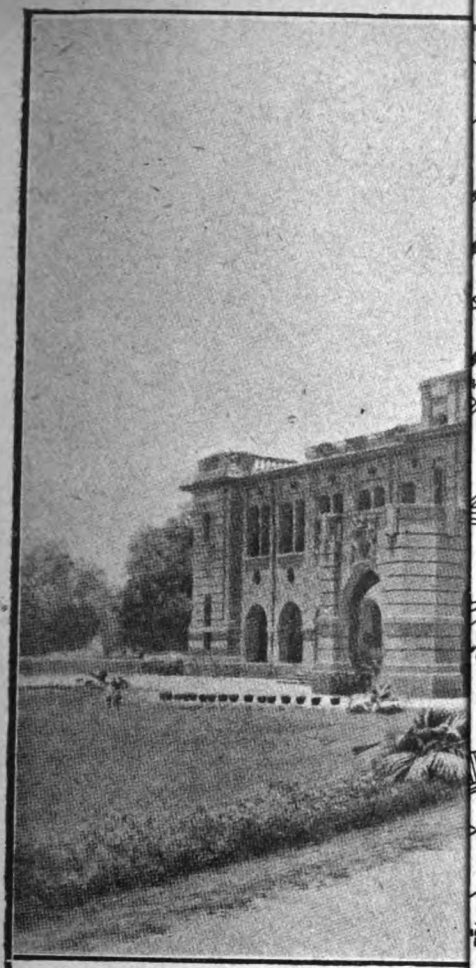

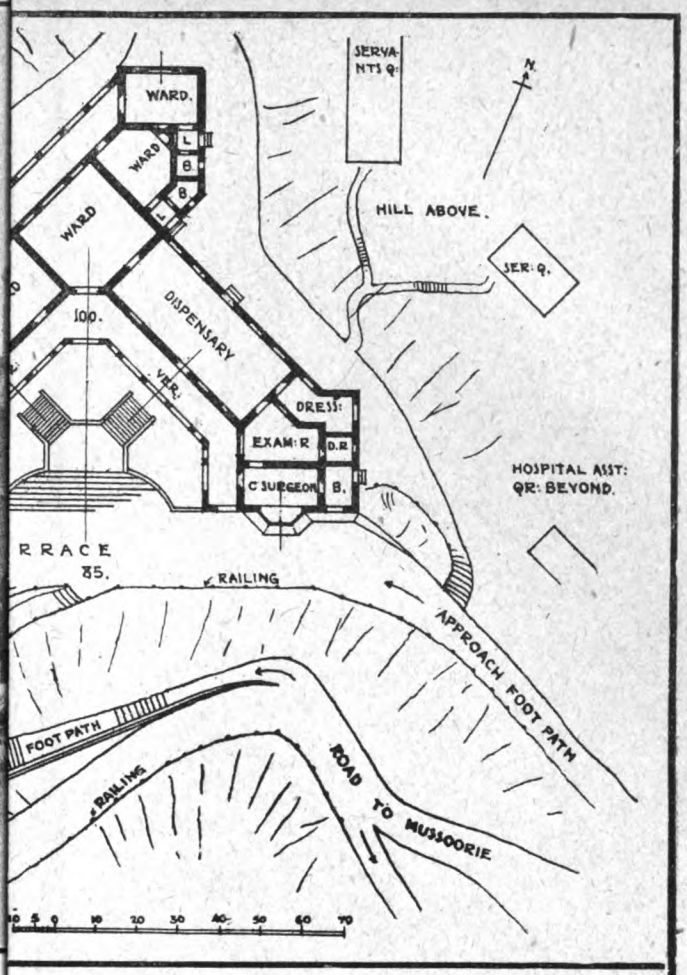

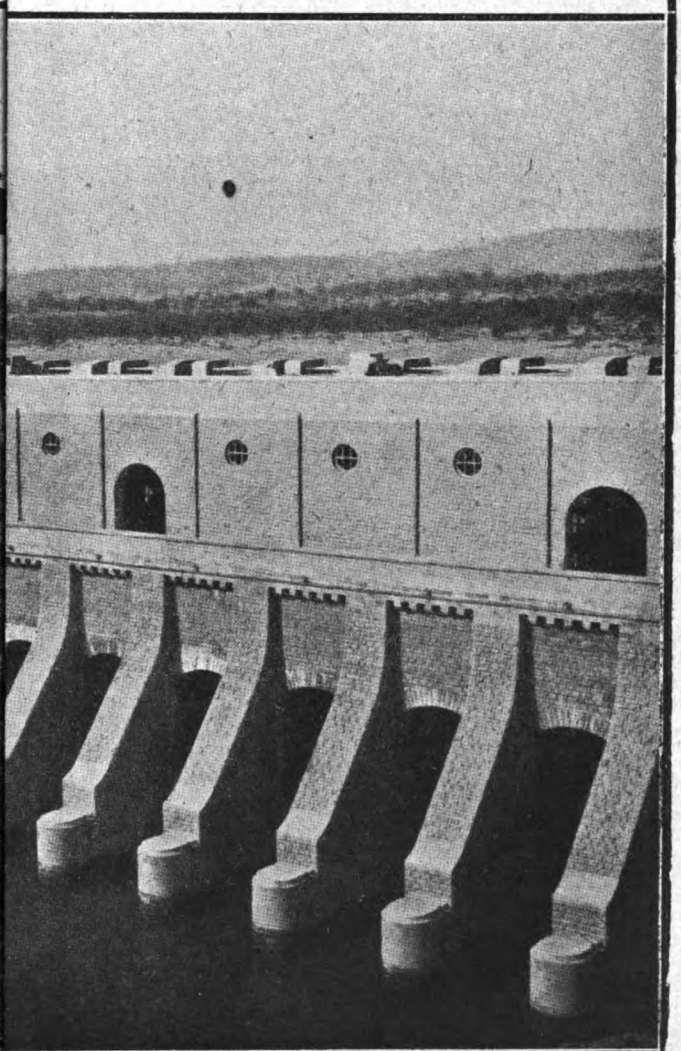

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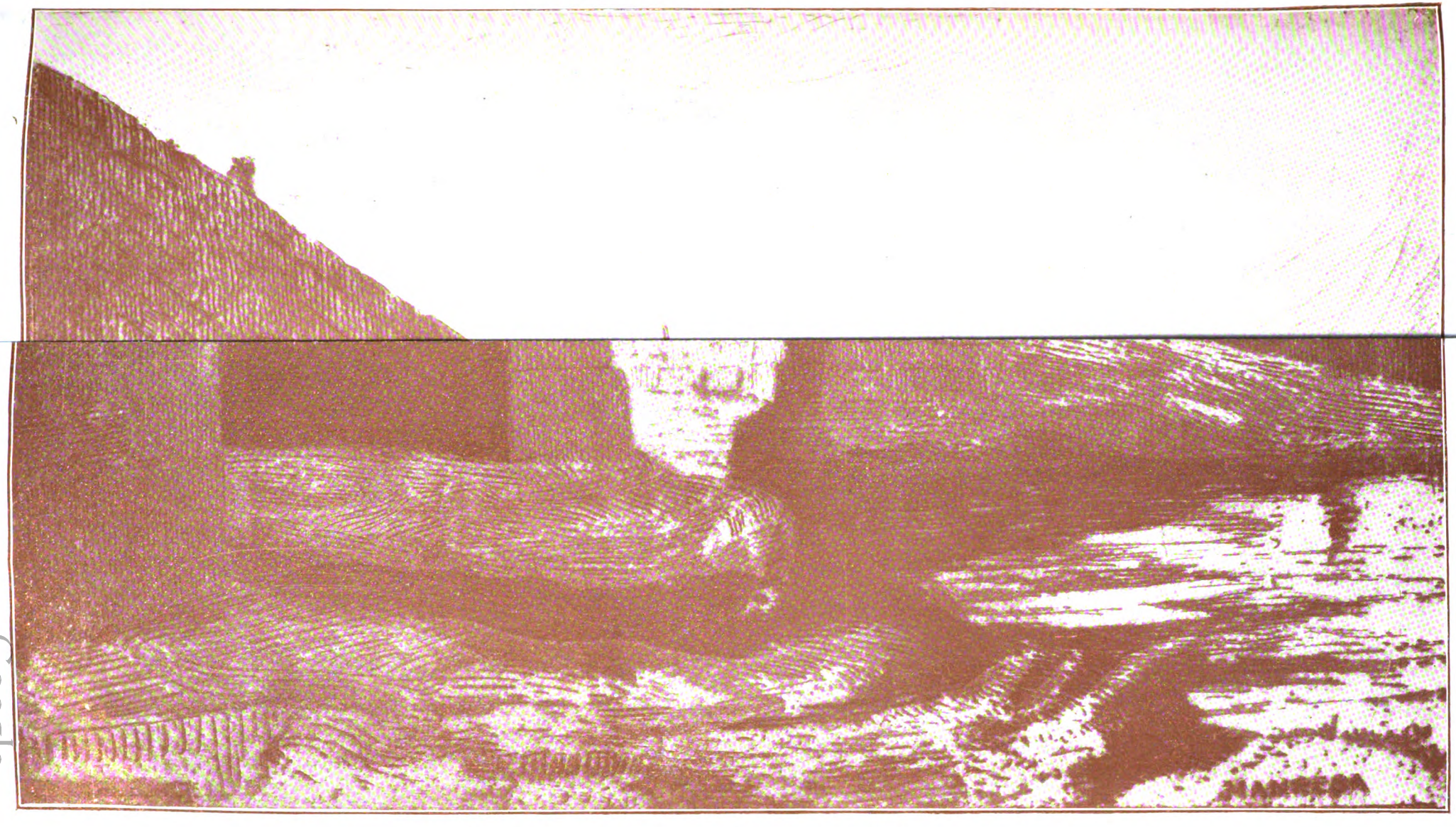

THE BRIDGE, MANRESA, SPAIN.

(Royal Academy Winter Exhibition of Graphic Art).—From an Etching by Sir Ernest George, A.R.A.

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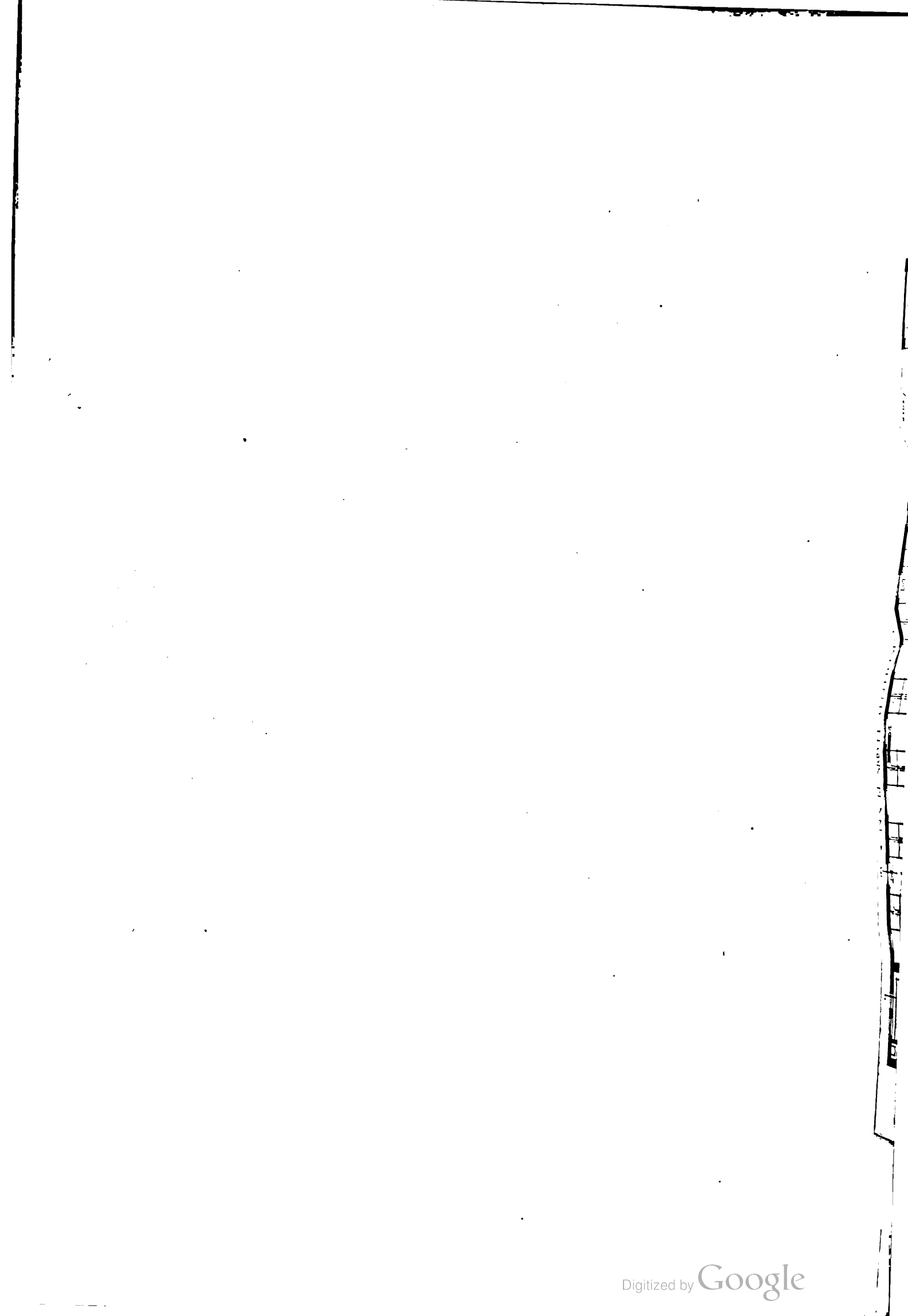

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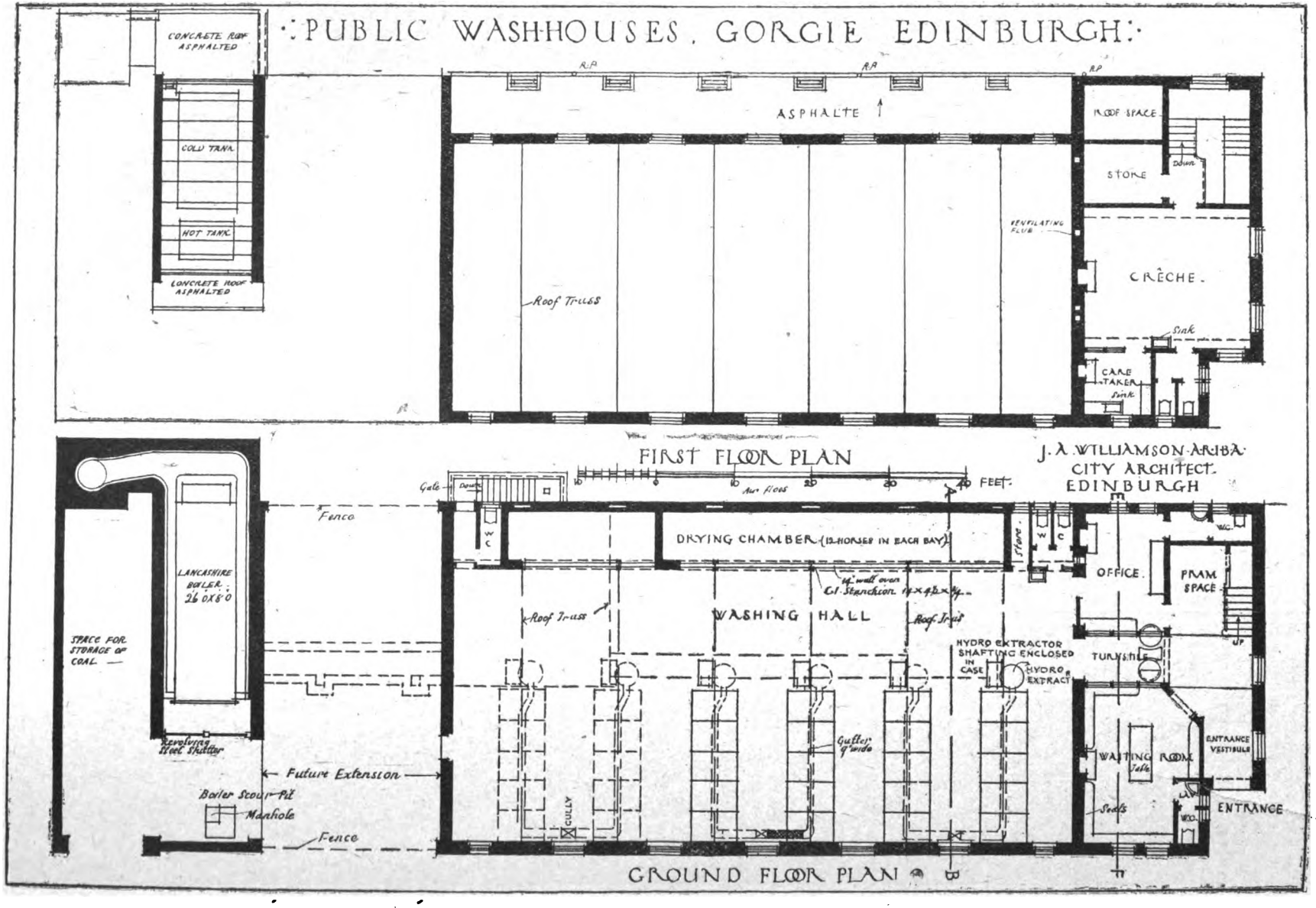
PUBLIC WASH-HOUSES, GORGIE EDINBURGH.
CONCRETE ROOF ASPHALTED
COLD TANK
HOT TANK
CONCRETE ROOF ASPHALTED
ASPHALTE
Roof Trusses
VENTILATING FLUE
ROOF SPACE
STORE
Down
CRÈCHE.
Sink
CARE TAKER
Sink
FIRST FLOOR PLAN
J. A. WILLIAMSON A.R.I.B.A.
CITY ARCHITECT.
EDINBURGH
Gate
Fence
DRYING CHAMBER (12-HORSES IN EACH BAY)
Stone
W C
OFFICE.
PRAM SPACE
WASHING HALL
Roof Truss
HYDRO EXTRACTOR SHAFTING ENCLOSED IN CASE
HYDRO EXTRACT
TURNSTILE
LANCASHIRE BOILER. 26'0 X 8'0
SPACE FOR STORAGE OF COAL
Gutter & Grids
WAITING ROOM
Seats
ENTRANCE VESTIBULE
ENTRANCE
Future Extension
Boiler Scour Pit
Manhole
GULLY
Fence
GROUND FLOOR PLAN

Our Illustrations.

THE BRIDGE, MANRESA, SPAIN (ROYAL ACADEMY WINTER EXHIBITION OF GRAPHIC ARTS).

The "Manresa Bridge, Spain," is a reproduction of Sir Ernest George's beautiful and powerful etching now in the Royal Academy Exhibition. It shows the romantic bridge that spans the Llobiegat. Manresa is surrounded by the fantastic peaks of the Monserrat Range. The height of the bridge and the strength of its piers were determined by the varying conditions of the stream, which, like most Spanish rivers, show a dry waterbed at times, and anon, when under spate, is a rushing torrent. This imposing structure has only the width of a mule path or track for pack-horses. On the side of the hill a convent has grown up around the rock cave in which Ignatius Loyola saw visions and spent his rigorous days. This etching is one of a pair shown as above stated, which are Sir Ernest George's present work, but his studies for them were made some thirty years ago. The second picture, which we shall shortly illustrate, represents the Castello and Ponte S. Angelo at Rome.

MODERN ARCHITECTURE IN INDIA.

Particulars of these illustrations will be found in our descriptive article on page 158.

PUBLIC WASHHOUSES FOR THE GORGIE DISTRICT OF THE CITY OF EDINBURGH AT McLEOD STREET.

The Lord Provost, Sir Robert K. Inches, recently opened this building, which is the sixth establishment of the kind erected or yet to be built in the city. Owing to the large proportion of two- and three-apartment houses of the flatted type in Edinburgh, where domestic washing facilities are not of the best, the public washhouse has become a popular institution, and as the charge of 2d. per hour for the use of the facilities afforded is so moderate, the demand for further buildings in other localities is as yet unsatisfied, being postponed only on account of the war.

Externally the buildings are carried out on simple and unpretentious lines, and depend on these qualities for any architectural merit they possess. The building at McLeod Street is entirely built of brick and rough cast. The interior walls of the washing hall are lined with white glazed bricks, the roofs of steel construction, lined with timber boarding and painted in pure white, the roof principals being picked out in green. The entrance is flanked on one side by a large waiting room, and on the other by the control office, which, from its position, ensures surveillance over the washing hall. Over the entrance is a children's crèche, where a caretaker looks after the children of the mothers while they are engaged at the washing tub. This is believed to be a commendable provision peculiar to Edinburgh. While there is ground available for an 80-tub building, it is restricted meantime to 60—40 tubs being actually at present installed, although the power is sufficient for the maximum. One difficulty peculiar to this class of building is the removal of vapour, ample ventilation of the natural kind being found to be most effectual. In this building the rear wall is carried up over the front line of the drying horses. This permits of windows on both sides of the hall. The upper part of these work louvre-wise, the lower section being fitted in with open metal gratings; the lantern sashes, being opened in groups from four points, afford ample top ventilation operating in conjunction with the side openings.

Each of the forty washing compartments is fitted with a steam boiling trough, with a cover and lid, and a washing and rinsing tub. A vapour pipe is led from the top of the boiling trough to a continuous pipe led through the roof from each group of ten stalls. The steam boiler—26 ft. by 8 ft.—is placed in an isolated boiler house, having large cold and hot water storage tanks in the upper part. The engine house is situated in a basement, and contains all the necessary calorifiers, steam batteries, fans, etc. The hydro-extractors are of the under-driven, self-balancing type, driven from an underground duct 5 ft. wide. Ample exhaust from the drying chamber is provided, there being an exhaust at the roof to the outer air for each group of ten drying horses. This amplitude of exhaust for the vapour generated within the chamber is found necessary to ensure rapid drying.

The cost of the buildings was about £6,000, considerable expense having been incurred owing to the intrusion of water in the excavations. The builders' work has been carried out by local builders, while the engineering contract has been excellently carried out by Messrs. Thomas Bradford and Co., of Crescent Ironworks, Salford, Manchester, to the specification of the city architect, Mr. James A. Williamson, A.R.I.B.A. We give plans, elevations, and sections from the contract drawings, and at an early date shall add a detail of the washing hall and drying-chamber section.

TRAMWAYS REORGANISATION.

The scheme for the reorganisation of the London County Council tramways service prepared by a special Sub-Committee appointed in August has been approved by the Highways and General Purposes Committee, and will be laid before the Council to-morrow. It is proposed to divide the work into five branches—traffic, electrical, rolling stock, permanent way, and general—with (the deputy chief officership being done away with) heads directly under the chief officer. The traffic manager will have control of a development and publicity section, as well as the operation section. Whilst not wishing to prejudge the question of the amount to be appropriated, the Highways Committee is satisfied that, apart from other forms of publicity, greater use should be made of the Press as a means of conveying to the public advantages peculiar to the tramways service.

RECOMMENDED APPOINTMENTS.

It is recommended that there should be appointed a traffic manager at a salary of £1,200, rising to £1,500 a year; an electrical engineer at a similar salary; a rolling-stock engineer at a salary of £1,000, rising to £1,200 a year (the position not to be filled at present); a chief clerk, and, in the traffic branch, a development superintendent (salary £500, rising to £800), a publiciy assistant (salary £300, rising to £400), and an operation superintendent (salary £500, rising to £700). Minor appointments and a re-arrangement of certain offices are also recommended. The ultimate additional expenditure involved is £5,600 a year. It is proposed to appoint Mr. J. R. Bruce, the present deputy chief officer, traffic manager, and to advertise the positions of electrical engineer, development superintendent, and operation superintendent.

A sub-committee has yet to report what alterations, if any, should be made in connection with tramways operation, with particular reference to services and fares and methods of collection of fares.

INCREASED RATES OF PAY.

The additional financial burdens placed on the tramways undertaking from the outbreak of the war to March 31, 1917, in respect of wages, etc., to employees, are as follows:—War bonus and war wages, £172,150; increases in rates of pay, £8,300; and war service allowances, £250,950—a total of £431,400. On the basis of the present establishment, the additional annual cost under these three heads is £268,400, which is equivalent to a charge of 1.288d. a car-mile run. The cost of salaries and wages in the tramways department has increased from 4.70d. a car-mile in 1911-12 to 5.60d. a car-mile in 1915-16.

MISCELLANEOUS.

The Local Government Committee has adjourned consideration of a suggestion that a tablet on No. 32, Craven Street, commemorative of Heine, the German author, should be removed, and of a proposal to rename Schubert Road, Putney.

The portrait of Mr. Cyril Jackson, chairman of the Council for 1915-16, painted by Mr. William Ouless, R.A., has been presented to the Council by Mr. Jackson and hung in the lobby to the Council-chamber.

FREEZING OF WATER MAINS AND SERVICES.*

BY WILLIAM WHITLOCK BRUSH.

The transformation of water from the liquid to the solid state known as ice, as a result of the abstraction of heat from the water, is a process familiar to all, but the exact conditions under which such transformation takes place are not so generally known. This withdrawal of heat may be by means of radiation, conduction or convection, the transfer of heat being accomplished by any one of these agencies operating singly or in combination.

Fresh water increases in density as the temperature is lowered until a maximum is reached at 39 deg. Fahr. There is then a gradual reduction in density to the temperature of 32 deg., when the liquid changes to the solid form known as ice, with a specific gravity of 0.89. It is this transformation that is particularly interesting to waterworks men, and some of the more important features of such transformation will be briefly discussed. The temperature of water is remarkably constant while ice is forming or melting. The temperature of the air may be many degrees below zero, but the temperature of fresh water, even though it be in a rapid running stream, will not be more than 0.01 below 32 deg. Fahr. Again, as long as there is ice in the water the temperature will only be a similarly small fraction of a degree above 32 deg. Fahr., even though the temperature of the air be many degrees above the freezing point. A mixture of ice and water forms the most constant temperature known to physicists.

It is popularly believed that running water may be lowered to a temperature of several degrees Fahr. below the freezing point before ice will be formed. This is an error. Absolutely still water may be cooled to approximately 10 deg. Fahr. below the freezing point without ice forming, but as soon as there is the slightest agitation of the water an immediate formation of ice takes place, and continues until the heat released by the change from water to ice warms the remaining portion of the water to the freezing point. The latent heat of the water at the freezing point is large, amounting to 80 calories per gramme, or sufficient to raise 143 lbs. of water 1 deg. Fahr. for every pound of water changed to ice.

FORMS OF ICE.

Ice is divided into three kinds, based upon the manner in which it forms—i.e., surface ice, frazil ice, and anchor ice.

These three forms of ice are all of interest to the waterworks engineer, not alone as affecting the problems to be met at the source of supply, when such source may be a reservoir or stream, but also in the distribution of water, as will be shown later.

FORMATION OF ICE IN WATER MAINS.

The formation of ice in water mains is dependent upon the temperature of the water in the main and the velocity of current, the pressure being of negligible effect, as has previously been shown.

It is probable that the water as drawn from a reservoir or stream is seldom below 33 deg. Fahr., as the formation of ice and the density of the water generally prevent the cooling of the water below this temperature. If the water in passing through the main is not reduced in temperature to below 32 deg. Fahr. there will be no danger of freezing. If it is reduced below 32 deg. Fahr. ice will begin to form, the ice forming a coating on the inside of the pipe, due to the high conductivity of the iron. As the ice film thickens, the transmission of the heat of the water to the surrounding earth and thence to the air is greatly retarded, the conductivity of ice being such a small fraction of the conductivity of the iron. If the velocity in the main is reduced through a lowering of the rate of draft, the water in the main is more readily cooled, and the rate of ice formation correspondingly increases.

This ice formation may be properly classified as surface ice. It is probable that in a main where the velocity is high the water

* From a paper read before the American Waterworks Association.

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is cooled slightly below the freezing point and a form of frazil ice created. Such ice might eventually clog the main, stopping the flow, and the whole mass of water in the main quickly change to solid ice. A stoppage in flow may also occur after a thaw, due to the loosening of the film of ice which has formed during the cold spell, and which may break up and flow through the water until it reaches a point in the main where the ice may not have broken loose and where the floating ice will become packed in such a manner as to completely stop the flow.

While this might account for the stoppage of flow in mains, especially in house services, after a thaw, which is an experience not uncommon to waterworks superintendents, there is a record of an actual reduction in temperature of soil below 32 deg. Fahr. following a thaw, and such reduction would be ample reason for the freezing up of water mains coincident with a thaw.

PREVENTION OF FORMATION OF ICE IN SUBAQUEOUS MAINS.

Where a main is laid in salt water it is common practice to lay the main without any earth cover. The iron is therefore exposed directly to the salt water, which is usually in motion, and heat may be rapidly abstracted from the water in the main through the three agencies of transmission —i.e., radiation, conduction and convection. Radiation is active in clear water, and especially so from the black pipe. The iron is also an excellent medium for conduction, with the heat being absorbed from the surface of the iron by the water flowing over the pipe. Convection will readily do its part within the pipe. The temperature of the salt water during a period of severe cold may be lowered several degrees below the freezing point, and under such conditions ice will form in the water main, and the main will be completely clogged, unless the rate of flow is sufficient to maintain the temperature at the discharge end of the main at or above 32 deg. Fahr.

If a main is laid in a body of fresh water there is little danger of freezing except at the point where the main enters the water, as the temperature of the water will be above 32 deg. Fahr., and a covering of surface ice will prevent excessive radiation. If the main is laid in the bottom of a rapidly-flowing fresh-water stream, it is possible that, through radiation and the cooling of the water in the stream, ice might form in the main, but it is improbable that such ice would be of sufficient thickness to interfere with the delivery of water through such main.

FROST PENETRATION ON LAND.

The committee of the New England Waterworks Association, which reported in 1909 on freezing of water mains, stated in their report that they had received ninety replies from 320 circulars sent out to waterworks engineers and superintendents, fifty-three communities had had trouble with freezing of mains, 50 per cent. of the freezing had occurred at dead ends, and in all cases there had been little or no velocity.

In all but three cases the mains were smaller than 10 ins. in diameter, and only seven as large as 8 ins. in diameter. In every case the ground was frozen below the axis of the pipe; 40 per cent. of pipe was laid in clay, 48.6 per cent. in gravel, 5.7 per cent. in sand, and 5.7 per cent. in rock. The depth of penetration of frost was found to be 1 ft. greater in the streets than in the fields, and 1 ft. 5 ins. deeper in gravel than in clay, the depth in sand being about midway between the depth in clay and in gravel. The ice was found at times in concentric rings in pipe as large as 24 ins. in diameter, and no stoppage of the pipe had occurred. The ice formation was not always solid, but sometimes in the form of slush. The depth of frost penetration varied materially.

The committee called attention to a belief or tradition that existed in the minds of many plumbers and waterworks superintendents that most stoppages occurred during a thaw, following a period of severe cold weather, it being suggested that this might be caused by evaporation from the surface during the early stages of the thaw, producing additional refrigeration or reduction of temperature at the depth of a water main sufficient to cause freezing. The committee comment that the reports received did not support the theory.

PREVENTION OF FORMATION OF ICE IN MAINS AND SERVICES.

Where frost penetration has extended to, and possibly beyond, the level at which a water main or service has been installed, the water in the main or service will freeze unless the temperature of the water in such main is kept at or above 32 deg. Fahr. This can only be accomplished by having such quantity of water pass through the main that the rate of abstraction of heat will not be sufficiently rapid to cause the temperature of the water to fall below 32 deg.

By testing the temperature of the water as it is drawn from a hydrant it can be determined whether there is or is not likelihood of the main freezing. No rule can be formulated which would answer the question as to whether a main will freeze under given conditions. A protecting covering is certainly a great aid in reducing the danger of freezing, and snow on the ground is an almost sure preventive.

THAWING ICE IN MAINS AND SERVICES.

The problem of thawing out frozen mains and services has been greatly simplified through the utilisation of the electric current at low tension. While it was found that this method was not of much value when applied to a main laid in water, where the heat generated through the passage of the electric current would be rapidly dissipated by the flowing current of water, the condition where the pipe is covered with soil is entirely different and much more favourable to the thawing of the main. As the electric current passes through the metal the heat generated will thaw both the ice which is formed within the main and the ice which is formed in the soil outside of the main. The transmission of this heat to the surrounding earth and thence to the surface is very slow, and a comparatively small amount of current is required to make the necessary change from ice to water. It is not necessary to describe the actual application of electricity to the mains, as this has been set forth in detail many times.

STATUES AND MEMORIALS.

THE LATE CAPTAIN SELOUS.—At a meeting of the friends of the late Captain F. C. Selous, D.S.O., held in the board room of the Natural History Museum, it was decided that a committee should be formed to promote a memorial of him. It is proposed that the memorial shall, either in part or whole, be in the form of a bas-relief to be erected in the British Museum of Natural History among the trophies of the explorer's skill. Subscriptions may be sent to the hon. treasurer, Mr. C. E. Fagan, Secretary of the Natural History Museum, Cromwell Road, S.W. Any other communications should be addressed to Mr. E. C. Stuart Baker, the hon. secretary, at 6, Harold Road, Upper Norwood, S.E.

A lead coffin and two stone coffins have been discovered at Poundbury, Dorchester. The lid of one, which contained a small skeleton, was so heavy as to require half a dozen German prisoners to lift it. The discovery was discussed at a meeting at the Dorset County Museum, and Mr. Thomas Hardy said the finding of the coffins bore out the tradition that Poundbury was an old Saxon burying place.

The Bishop of Liverpool presided at the annual meeting of the Diocesan Church Building Society, held in the Church House last Wednesday. The report for 1916 stated that the society's work had gone on quietly and usefully, though its activities had run more in the direction of assisting enterprises that had been accomplished, or are nearing completion, than in developing new building operations. The continuance of the war and the abnormally high prices of building materials had naturally discouraged the opening up of new schemes. Two new churches, however, were in contemplation. Those were St. Luke's, Orrell, near Wigan, and St. Mark's, Edge Lane, which were to be begun as soon as a convenient opportunity should occur.

THE ARMOURIES OF THE TOWER OF LONDON.

A correspondent of the *Times* gives an interesting survey of the recent changes at the Tower of London. He says the high and airy basement, with its 18th Century brick vault has ceased to be the legendary dungeon where prisoners died by drowning, though, be it understood, it is, and always has been some 10 ft. above high-water mark. It now contains the fine examples of bronze ordnance which were gradually deteriorating under the influence of river mists and sulphur-laden air in the Gun Park outside. One of the most interesting of these is a "ring-tailed saker" of Henry VIII., shown with other guns which belonged to the same monarch. It was dredged up in Dover Harbour in 1914, and has been deposited in the Tower by the Lords of the Admiralty. In each bay are cannon of various nationalities, from the small hand wall-piece to the great 17 ft. Maltese gun at the farther end.

Passing from the Cannon Room, the visitor enters the Sub-Crypt of the Chapel of St. John, and proceeds through that architectural and historical absurdity, the "Little Ease," a doorway wherein the prisoner would be far more inconvenienced by the passing to and fro of people from one vault to another than by any ingenious contraction of space. From the sub-crypt the Mortar Room is reached, containing British and foreign mortars. The removal of the great Namur mortar, weighing some four tons, which stands near the door, was a triumph of which H.M. Office of Works may well be proud, for the wooden carriage is but a mass of dust and tinder, and under careless handling would have collapsed in ruins.

From the basement the visitor mounts the spiral stairs to the top floor and emerges in the Tudor Room, devoted to the priceless armours of Henry VIII. The cases round the wall show a sequence of helms and helmets, and some fine details of armour belonging to Henry VIII., which was recently transferred from Windsor by the King. On the walls are the weapons carried by Henry's Bodyguard, the "King's Spears," notable examples of the weapon-smith's craft. From this room opens the Horse Armoury, in the centre of which is a procession of figures in armour, horse and foot, showing the evolution of plate defences, from the graceful suit of the 15th Century to the cumbersome, but historically more interesting, gilt armour described in the Inventory of 1676, which is here shown in a case as belonging to "His late Majesty Charles I., of Ever Blessed Memory." Near to this is a large case showing the ornate armours of the Royal Princes, Henry, Charles I., and Charles II., and, in a small case, the cuirass and headpiece of James II. The passage-way at the south end, used for over thirty years as the Curator's office, has been opened into the main room, and the office of the Armouries has been removed to the North-East Turret, used by John Flamsteed, first Astronomer Royal, as an observatory in 1675.

On the floor below the visitor will find that the old rafters and ceiling have been exposed, and that the so-called "decorations," consisting of stars, serpents, doves, and other sentimentalities, wantonly twisted from service weapons which deserved a better fate, have been removed as undignified adjuncts to the national collection. Here are shown staff weapons, crossbows, axes, maces, and the great lance of Charles Brandon, boon companion to Henry VIII. The Oriental arms, which were formerly shown in the adjoining room, have recently been removed to the British Museum, as they had no connection with the Tower or the development of arms and armour. In their place are exhibited swords from the 11th to the 19th Century, including an interesting set of Stuart swords, with which is the Sword of State carried before Prince James Edward—disrespectfully known as "the Old Pretender"—when he was proclaimed James III. of England at Scone.

Passing down the south staircase the visitor reaches the Gun Floor, which has hitherto been entirely closed to the public, as it contained the store of service arms. From the Gun Floor opens the crypt of the chapel,

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and here *habitués* of the Tower will doubtless miss the figure of Queen Elizabeth, a theatrical anachronism which was redressed in 1872, and only dated originally from the last years of the 18th Century. In place of this graceless figure are found the execution block of Lord Lovat and the small collection of chains and pinioning irons, which can never, by any stretch of the imagination, be regarded as "instruments of torture."

The Record Room leads out of the crypt and contains relics of the Tower, models, plans, etc., which are not part of the Armouries Exhibition. Here the visitor ends his tour with the gun-carriage on which "Edward the Peacemaker" was carried to his rest. In a small case at the side is the cartridge case of the first shell ever fired against a foreign enemy from the City of London when the anti-aircraft guns came into action on the night of September 8, 1915. In the centre are two cases; one contains swords presented to the Armouries by our Allies in the present war, and the other holds the sword of Lord Wolseley, the revolver of Lord Roberts, the sword of Lord Kitchener, and the famous letter written by him to the nation.

PARLIAMENTARY NOTES.

WHERE IS THE DAFFODIL?—Mr. Bonar Law, replying to Mr. MacCallum Scott (L., Bridgeton, Glasgow), last week, said the national emblems which appeared in the water-mark of the new £1 Treasury note were the rose, the thistle, the shamrock, and the daffodil. Mr. MacCallum Scott: Are these visible to the naked eye? Sir W. Essex (L., Stafford): To what part of the Kingdom does the daffodil belong? ("Hear, hear," and laughter.) Mr. Bonar Law: I understand it is regarded as the emblem of one part of these islands, but I am not an authority on the subject. All the emblems can be seen by the naked eye, because I have seen them myself.

THE COMMANDEERED HOTELS.—On Thursday last Lord Midleton raised the question of the unprecedented expansion of Government offices, and told the House of Lords that, since the pressure of the Retrenchment Committee had been relaxed, there had been an uncontrolled orgy of expenditure. In two years there had been taken up for the benefit of the Government in London alone eight hotels, two clubs, a town hall, and fifty other buildings, not to speak of wooden buildings which had been erected all over the metropolis. The office accommodation and the staff had been more than doubled. The staff in the Munitions Department had within two months risen to over 100,000. A gentleman who had occupied rooms for business purposes for several years was told to clear out. On his saying that he could not do so at once, a soldier was sent to remove him. He managed to obtain only a few days' respite, but the rooms were not occupied for Government purposes until many weeks later. Another gentleman had said that the Government took over his rooms in Whitehall Court. Four months afterwards he found that a man whom he had dismissed and who was thoroughly efficient for military duty was actually working the lift. Lord Midleton's own attention had been called to a large flat which was occupied by only two clerks and a lady assistant. Lord Curzon admitted that the Government had been the parent of a numerous offspring, but suggested that it was healthy and useful. There were many cases in which buildings and rooms were grossly overcrowded by men working in the public interest. There were more congested districts in London in connection with war services than in Ireland. Still, the Government were fully conscious of the danger. Investigations were being made, not only by Sir Alfred Mond's Accommodation Committee, but by a committee under the chairmanship of Sir Compton Rickett, which was dealing with the question of staffs.

FURTHER LIMITATION OF BUILDING LICENCES.—Dr. Addison informed Sir T. Esmonde on Monday that the Order in Council of July last required the issue of a licence for all building work of the value of £500 or over, and for any work involving the use of constructional steel. For the future he was obliged to consider a further limitation of licences, and it would be of great assistance if applications even for small amounts were limited to those required, either for urgent repairs or for work of national importance.

PROFESSIONAL AND TRADE SOCIETIES.

ARCHITECTURAL ASSOCIATION OF IRELAND.—At a meeting of the members of the Architectural Association last week in their rooms, South Frederick Lane, Dublin, Mr. H. G. Leask presiding, Mr. A. Ernest Child delivered a lecture on "Stained Glass." He said that the beginnings of stained glass were but imperfectly known, but that there was little doubt that the art of making such glass originated in the East. Having described the process of manufacture, the lecturer exhibited on the screen a number of interesting photographs and sketches of pattern windows, composed chiefly of almost colourless glass, such as the Five Sisters window in York Minster, figure windows in rich colours, medallion windows, in which the pictures are in medallion form, set in frame-work of an ornamental description, as in Bourges Cathedral. Pictures of Irish-made stained glass were also shown, including a beautiful window designed by the lecturer, and set in the Roman Catholic church at Castletownbere.

GLASGOW CATHEDRAL.—Mr. T. L. Watson, F.R.I.B.A., delivered an address upon "Glasgow Cathedral in the Thirteenth Century" to the members in the Edinburgh district of the Scottish Ecclesiological Society on Saturday week. He said the Cathedral of Glasgow was a page of history. It differed essentially from other cathedrals in the possession of an upper and lower choir, and in the unusual method followed in its construction, which was such that successive phases of architectural style were fully displayed and contrasted. Above all, it offered a unique example of an earlier plan supplanted by a later, but in such fashion that both might be read as in the earlier and later manuscripts of a palimpsest. The key to the history of the building would be found in the fact that the lower aisles and the adjoining middle compartment were of different periods, and that in the interval that elapsed between them the entire fabric of the choir above the level of the lower church was constructed. During this interval architectural style had developed from an early and immature condition into the perfected Gothic art of the thirteenth century, so that there were two widely different styles in immediate contact with one another, but so well harmonised that their difference of date was not recognised until about 30 years ago. When the lower church was built there was of necessity a plan of the whole vault, but this was carried out only so far as the lower aisles, the outer springer-stones of the middle compartment, and a bridge of communication between the upper aisles. When, therefore, on the completion of the choir and clerestory, the builders returned to the middle vault and decided upon an entirely new plan, they had to alter the old springers or replace them with others, to adapt them to the later design, and from these altered and renewed springers we were enabled to recover the earlier plan of the vault. This discovery opened up the history of the structure as by the raising of a curtain. Jocelin's unfinished work of the twelfth century was demolished by Walter, the founder of the existing building, who reserved the portion first constructed as a temporary chapel for the use of worshippers during the erection of the Cathedral. Here, accordingly, was found a pillar taken from Jocelin's church, together with a fragment of the temporary altar and shrine of St. Kentigern. On Walter's death the work was continued by his successor, to whom we owe the greater part of the existing choir. The vaulting of the lower aisles was reached about 1240, but the middle and eastern vaults were delayed, the former till 1260 and the latter till 1270, the material for the choir and clerestory being brought in by way of the eastern aisle and hoisted from the middle compartment to its place on the walls. The later plan of the middle vault, dating about 1260, and based upon the chapter-house vaulting of the English cathedrals, was substituted for the original plan of 1240, notwithstanding the fact that it involved a large amount of additional work in the alteration of the early springers. To this we owed one of the greatest curiosities of architectural history, and to Bishop Bondington and those associated with him we owed the possession of one of the noblest buildings in Scotland.

THE ROYAL INSTITUTE OF THE ARCHITECTS OF IRELAND.—A meeting of the Council of the Royal Institute of the Architects of Ireland was held in the Council Chamber, 31, South Frederick Street, Dublin, on the 5th inst. Mr. W. Kaye-Parry, M.A., B.E., president in the chair. There were also present: Messrs. R. H. Byrne, G. P. Sheridan, F. Batchelor, A. E. Murray, H. Allberry, F. Hicks, R. C. Orpen, A. G. C. Millar, G. L. O'Connor, J. H. Webb, W. A. Scott, and F. Hayes, hon. secretary. Letters relating to town planning schemes, members of the profession returning after the war, and European Crisis clause in building contracts were dealt with. It was decided to convert the Institute's holdings in War Loan and Exchequer Bonds into new 5 per Cent. War Loan. The following resolution was passed in connection with the competition for designs for the proposed University Buildings, Dublin: "The Council of the Royal Institute of the Architects of Ireland regret the great delay in announcing the result of the competition for the new University Buildings of the National University of Ireland. They are of opinion that the delay of eight months in making known the award of the assessor is unfair to the architects who have taken part in the competition." A report from the Professional Practice Committee containing the following resolution was received and passed: "That it is undesirable, in the general interest, that public officials should act as architects for private persons or have any pecuniary interest in any buildings which are under their control."

THE ARCHÆOLOGICAL INSTITUTE OF AMERICA.—The general meeting of the Archæological Institute of America, in conjunction with the American Philological Association and the College Art Association of America, was held in St. Louis, December 27-30, 1916. Among the illustrated papers presented were: "Comparative Philology and the Classics," by Professor Carl Darling Buck, of the University of Chicago, President of the Philological Association; "A Collection of Some New Testament Papyri," by Wallace N. Stearns, of the University of North Dakota; "Where Archæological Investigation left off in Palestine and Assyria," by George L. Robinson, of Chicago Theological Seminary; "Relation of Climatic Changes to Archæological Studies," by Ellsworth Huntington, of Yale University; "The Study of American Art in American Colleges," by Herbert Richard Cross, of the University of Michigan; "The Place of Architecture in the Liberal Arts Course," by Alfred M. Brooks, of the University of Indiana; "Great Monuments of the Architecture of India," by T. Lindsay Blayney, of Rice Institute; "The Sanctuario of Chimayo," by Paul A. F. Walter, of the School of American Archæology; "Cave Pictographs of the Rito de los Frijoles (New Mexico)," by Kenneth M. Chapman, of the School of American Archæology; "Foundations of Our National Architecture," by Fiske Kimball, of the University of Michigan; "The Archaic Architecture of New Mexico," by William Templeton Johnson, of San Diego.

Mr. Charles John Coffin, of Devonshire Avenue, Milton, Portsmouth, retired brick merchant, left £200 to the Portsmouth, Portsea, and Gosport Hospital, and a total of £31,363.

At a general meeting of members of the Royal Society of Painters in Water Colours, Mr. Moffat Lindner, Professor Moira, and Mr. A. Reginald Smith were elected Associates of the society.

The death is announced of Sapper R. Dunkeld, Royal Engineers, who, up to the time he joined the Army, was surveyor for the Dore district of Herefordshire. He was very seriously wounded in action on the Western front some four weeks ago, but the doctors had hope of his recovery, but succumbed to his injuries on January 26. The deceased soldier, who is a Scotsman, and was only 26 years of age, was appointed surveyor of Dore district just over two years ago.

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Correspondence.

A WORTHY WAR MEMORIAL.

To the Editor of the BUILDING NEWS.

Sir,—Pardon my delay in thanking you for the excellent and appreciative article which appeared in THE BUILDING NEWS of the 14th inst., and for illustrating the design.

I am happy to say that I am receiving satisfactory evidence that the proposal is the right one.

As you suggest, the plan is open to modification, and I am in communication with the Abbey authorities to endeavour to be able to make the detailed survey to which you refer.

When I get further on with the drawings I will let you know.

Yours faithfully,
WM. WOODWARD.

10, Church Row,
Hampstead, N.W.
February 17, 1917.

Sir,—When a few months ago, I lent my friend, Mr. W. Woodward, my 2-ft. rule with which to take some dimensions in the Chapter House at Westminster, I had little idea that he was collecting data for the scheme published last week in the *Daily Chronicle* and by yourself. In many respects it is a good scheme, but, in my opinion, not in all, and I trust that he will forgive me for criticising it.

At the present moment, especially now that Ypres has ceased to exist, Westminster presents the most perfect group of Gothic buildings, ancient and modern, that the world possesses. Its beauty is marred by the row of mean houses between the Abbey garden and the House of Lords. Their entire removal, advocated by Mr. Woodward, is, as he says, in every way desirable, with the consequent opening up of the Abbey garden wall and the ancient Jewel House, and of a view of the Abbey church from the south-east.

So far opinions are not likely to disagree; but one doubts whether, in planning the Memorial Chapel, Mr. Woodward can have recognised that, as shown, it would involve the destruction of the clergy houses round the so-called "Little Cloister" (more properly the "Infirmary Court"), and with them of the Cloister itself, which, as now existing, is part and parcel of these houses. It is a beautiful feature, with a history of its own, whose loss would be irreparable; and, moreover, with it would go the Norman arcade (or so much as remains of it) of the Chapel of St. Katherine, which opened to the east of the Little Cloister—rarely seen by the public.

May I suggest that it would be more logical to restore that arcade, and to enter the Memorial Chapel through it, from the Little Cloister, at the same level, than by a winding passage from the higher level of the Chapter House; and that the plan should be so altered as to leave the clergy houses standing?

But, it may be asked, would the chapel be then large enough either to serve its purpose as a Valhalla or to be a worthy memorial of our country's part in the great war? Would it be so even as planned by Mr. Woodward?

I greatly doubt it. Size is not everything, I grant; but in this matter size is imperative if the imagination is to be adequately touched.

Much more adequate as a war memorial would be either the provision of a road bridge across the river where the Charing Cross railway bridge now stands, or the opening up of the half-circle between Kingsway and the Strand (now vacant) as a "Place de la Guerre," with fountains and statuary, and with the offices of the great Dominions around it. Yet what London needs, as the capital of a great Empire, is a memorial church capable of accommodating as huge a congregation as, say, the Albert Hall for occasional ceremonial use, and so planned that everybody could both see and hear. Some will say that we have St. Paul's. True, but it is notoriously too small, so that at the second Jubilee service in Queen Victoria's reign the ceremony took place on the steps outside; while the less said about its acoustic properties, and the possibility of a congregation taking an intelligible part in a great service, the better.

And such a church would be no white elephant. It would form the "Valhalla," for which there is a call, as a consecrated Christian edifice.

And it should be very beautiful and so placed as to be visible—say, on the south side of the Thames, opposite the Adelphi.—Yours faithfully,

G. A. T. MIDDLETON.

COINAGE DECIMALISATION BILL.

SIR,—I would invite attention to a draft of a proposed Bill for the Decimalisation of Our Coinage, published for general information in the *Times* Trade Supplement of February, 1917. The draft is, apparently, to be circulated to the British Chambers of Commerce only, when, if approved, the Bill will be laid before Parliament. The question concerns other people besides members of the Chambers, and the terms of the Bill are well worth consideration. Compulsion is intended, for there is a clause making it illegal to use any other than the decimal "coins of account," as such, and making void any document in which, after the proposed date of the Act (1917), any other coins are mentioned. I may add that there is a very strong feeling among engineers and manufacturers that the Decimal Association is not "playing the game." The engineering professions and working classes are straining every nerve and devoting all their energies—mental and physical—to beating the enemy in munitions, ships, plant, etc. The decimal agitators chose this awful time, when their strongest opponents are either nearly worked to death at home or in the trenches abroad, to press the passage of an Act which the engineering classes of this country think unfair, injurious, and unnecessary. Without munitions, not human courage, gold, nor credit, are of avail. If any of the British deserve consideration, who but those men who have, for the ninth time in our island story, consecrated the British inch, the British pound weight, and the British penny, with their blood and their sweat? Our export trade depends upon the engineer and the manufacturer, and financiers and merchants are willing enough, when it suits them to do so, to proclaim that our exports must at least balance our imports, yet the same commercial community cannot refrain from constant nagging at and continual meddling with the units the engineering classes find essential to their business.

The first schedule at the end of the draft Bill ought to be a revelation to most people. It is proposed to retain the sovereign and the half-sovereign as they are. We are to have four-shilling and two-shilling pieces, and to abolish the crown and half-crown. The shilling is to be called a 50 cent piece, and the sixpence a 25-cent piece. So far, the coins seem merely to change their names; but in spite of metric bounce that halves and quarters are permissible, we are to be deprived of the useful half-crown.

The penny and farthing (as we know them) are to be abolished, and in their place we are to get a British dime of 2.4d., a half-dime of 1.2d., a new penny of 0.96d., a new half-penny of 0.48d., and a British cent, or new farthing, of 0.24d. That is: 12½ pennies will make a shilling, an "awkward, vile, intolerable, clumsy" number, worse, if anything, than the "5½ yards," which metric advocates so much object to as making the British 5-metre rod, pole, or perch! Further, no dealer in his senses could possibly take 0.96d. for an existing pennyworth; so accepting the above two practical objections as insurmountable, it seems certain that the actual new penny must be the 5-cent half-dime, valued at 1.2d.

Your readers will notice that the smaller coins only are affected, and with them every small transaction. The poor, and men and women of moderate means, will pay for the privilege of decimalisation of the British coinage. Fluctuations in prices do not affect the issue, as that great statesman, Mr. Gladstone, plainly saw. Whatever the current prices, at the time of the passing of the Act, may be, the new penny will NOT be accepted as the equivalent of the present penny; and the next coin is nearly a penny-farthing, in present values.

The most curious thing in the tangle is the inability of decimalists to perceive that for the purposes of accounting of all kinds, for wholesale and foreign trade, and in large transactions, they possess an invaluable decimal currency already. If the sovereign is divided into 1,000 imaginary cents of account, NOT COINED, the matter is perfectly clear. Sums can be stated, and books kept, in £, florins, and decimals of florins. For practical use, in home payments of all kinds, there would exist the sovereign of 1,000 cents, the half-sovereign of 500 cents, the crown of 250, the half-crown of 125, the florin of 100, the shilling of 50, the sixpence of 25, and the three-penny bit of 12½ "cents of account." For smaller sums only, the practical equivalent for a cent would be an existing farthing. We merely divide the three-penny bit into twelve convenient instead of 12½ inconvenient parts.

There is no case at all for "decimalisation," in either British currency or weights and measures. We have everything necessary for working in tens in both systems already. The agitation is purely artificial.

E. A. W. Phillips, M.Inst.C.E.

Hove.

LEGAL INTELLIGENCE.

A DECORATOR'S CONTRACT.—SAVAGE AND CO. v. HARVEY.—Before the Lord Chief Justice and a Special Jury, Messrs. Savage and Co., architectural decorators, of Albemarle Street, Piccadilly, sought to have a declaration that the contract made between them and Mr. A. R. Harvey, of Waterloo Place, should be rescinded; they also claimed damages against defendant, who denied the allegations. Mr. Patrick Hastings, in opening the case, on February 13, stated defendant entered into an agreement with the plaintiffs, who were to carry out decorative work and supply furniture to the value of £10,190 13s. The work was carried out at Highwood House, Mill Hill. Defendant was connected with two Canadian companies and had palatial premises at Waterloo Place, where he carried on business in a regal style. In July, 1915, Mr. Savage was introduced to the defendant. Defendant had described himself as a financial adviser to the Cabinet, and said he had an income of £100,000 a year. He also stated that his income from the two companies alone was £20,000 a year. Gathering from this that defendant was a man of wealth, the plaintiffs risked their capital in carrying out the contract. It was afterwards found that these orders were given by defendant between two periods of bankruptcy. In May, 1911, defendant was bankrupt for a sum of £49,000. In May, 1913, he applied for his discharge. This was granted subject to a judgment for £60,000, which was to be paid at the rate of £2,000 a year. There was £16,000 still owing to the creditors on the first bankruptcy. A writ was issued against defendant for £517 for other work done by another firm at the same house, and judgment was given for this amount. In November, 1916, defendant was bankrupt again, and as far as he (counsel) knew, he had not applied for his discharge. Plaintiffs had not been paid anything for the work done at the house. Mr. Arthur Livingstone Savage, trading as Savage and Co., gave evidence. He stated that the defendant described himself as a financial adviser to the Cabinet. He also spoke of the Prime Minister and members of the Cabinet as though they were intimate friends. The sum of £9,222 16s. 5d. had been spent in carrying out the work. Furniture and other goods had been returned to his firm to the value of £3,118 16s. 2d. Owing to witness putting his capital in the contract he had been hampered in his business. In cross-examination witness said he was introduced to the defendant by a Mrs. Lubbock. Defendant volunteered the statement that he was a financial adviser to the Cabinet. He was very persuasive and plausible. It was untrue that there was any "faked" antique furniture put into the defendant's house by plaintiff's firm. At the adjourned hearing, on February 14, an official, who attended on behalf of the Senior Registrar in Bankruptcy, produced a file of the bankruptcy of A. R. Harvey in respect of a receiving order made in February, 1911. The liabilities were £45,000 and the assets 9s. 2d. The bankrupt obtained his discharge on May 22, 1913, subject to a judgment for £20,000, payable at the rate of £2,000 a year. By July, 1914, he had paid £8,000. The date of the receiving order in the second bankruptcy was

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November 22, 1916. No public examination had yet taken place. The statement of assets and liabilities prepared by Mr. Harvey showed that liabilities were £158,000, and surplus assets over liabilities £152,000. Shares were put down at £115,513. The defendant said he was a financier, and president and managing director of Flax, Limited, a Canadian company, up to 1916, and of Oil Processes, Limited, a Canadian company. From each company he received £11,500 a year. His friend, Mrs. Lubbock, asked him to give plaintiff an order. Plaintiff first called on him to invest £1,000 in Oil Processes, Limited, which witness refused. Major Lubbock pleaded with witness to give the plaintiff a trial, and witness did so. The plaintiff agreed to do the work of furnishing and decorating the house for 10 per cent. above cost price, and witness said he would make it 12½ per cent. if the work was satisfactory. He might have told the plaintiff he had £20,000 from the two companies, but he did not say he was financial adviser to the Cabinet or any member of it. For the year ending April, 1915, he was assessed for income-tax at £52,000 or £53,000. Cross-examined.—On September 17, 1915, he was a rich man. He had hoped then that Flax, Limited, would continue to bring in dividends of £25,000 a year. He started in business as a general draper at Bootle, Liverpool. Then he took up insurance work and made £5,000 to £6,000 a year. Then he obtained a patent and formed a company, from which he made a large income. He lived on one-third of his income, and gave away 50 or 60 per cent. of what he earned. It was true that at the bankruptcy proceedings he said that when he came to London in June, 1909, he was insolvent. Mr. Hastings: I suggest that these two companies of yours were conceived by you in fraud, and that you used them to defraud people ever since? Witness: It is a most blackguardly statement, absolutely untrue. Witness admitted that Oil Processes, Limited, was wound up in the Chancery Division. That was because it could not collect its money owing to the war. In June, 1914, a circular was sent out stating that the shares in the company had gone to a premium. At that time there was considerable negotiation in respect of the sale of foreign rights. In 1915 a report was issued by the Oil Processes, Limited, stating that the year's profit was £231,000. That referred to rights sold to an American company and also in France. The company went into liquidation in 1916. Mr. Hastings: I suggest that, finding your companies were on their last legs, you thought the best chance of getting more money was to pretend to be a rich man living in an expensive establishment? Witness: I am sorry for your mind to suggest such a thing. In re-examination, witness said that the first president of Oil Processes, Limited, was Sir Oliver Lodge. On Friday the jury returned a verdict for the plaintiff for £5,250 damages, and his Lordship gave judgment accordingly with costs, and granted a declaration rescinding the contract.

FERRO-CONCRETE PATENTEES V. CONTRACTORS.—L. G. MOUCHEL AND PARTNERS V. PERRY AND CO. (BOW), LIMITED, APPEAL.—On Februry 13, in the King's Bench Division, before Justices Bailhache and Atkin, a motion was made by the defendants to set aside the judgment of the Official Referee, which we reported on page 434 of our issue of November 1, 1916. Mr. Colam, K.C., and Mr. Russell Davies appeared for Messrs. Perry, and Mr. Newbolt and Mr. Horace Rowlands for Messrs. Mouchel.—Mr. Colam argued that it was an implied term of the contract that the plans and specifications and quantities should be accurate. The further hearing of the case was adjourned for a month.

TRADE NOTES.

Boyle's latest patent "air-pump" ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, E.C., have been employed at the Conservative and Unionist Club, Great Heath, Coventry.

Mr. Charles J. Blomfield, F.R.I.B.A. (late senior partner of Sir Arthur Blomfield and Sons), brings to our notice the fact that his brother and he having dissolved partnership at the end of last year, the firm of Sir Arthur Blomfield and Sons no longer exists. His business is now being carried on at 125, Park Road, N.W. (near St. John's Wood Station). Telephone, Paddington 567.

A meeting of the builders of the city of Truro was held at the Public Baths on Monday evening, Mr. T. H. Hill presiding. It was decided to grant the masons and carpenters 8d. per hour and labourers 6½d. per hour on and after March 3.

Our Office Table.

Sir Bampfylde Fuller, formerly Governor of Eastern Bengal and Assam, has undertaken charge of the War Office department for the control of timber. The department deals with the supply of timber for the Army, economy in its use for all purposes in the United Kingdom, the regulation of the purchase of imported timber, and the stimulation of the felling of timber in the country. All communications on the subject should be sent to Sir Bampfylde Fuller at Caxton House, Tothill Street, Westminster. Seen on Monday night by a representative of the *Daily Mail*, Mr. Montague L. Meyer, the Government timber buyer since the beginning of the war, said: "So far as I know, my position remains the same."

The sixty-second exhibition of the Society of Women Artists, open in the Suffolk Street Galleries is a good one, although there are not a few pictures which have been already shown in public. Miss Alice Fanner, Miss Dorothea Sharp, Miss A. K. Browning, Miss Elsie Thompson, Miss Margaret R. Macpherson, and Mrs. T. Whately are the pillars of the Society. Miss Thompson's "White Pigeons" (183) is a close study of character, and Mrs. Whately's "Knightsbridge" (188) is a good presentation of buildings under snow. "Still Life" (231), by Miss Macpherson, is one of the best of her works.

The case of a Chesterfield joiner, who was eventually exempted, on the condition that he engaged in work of national importance for three days a week, raised the question last week at the Derbyshire Appeal Tribunal whether coffin-making was essential to the national interest. The military representative reminded the Tribunal that dead soldiers who had fought for their country were not buried in coffins. The man's solicitor suggested that the point was one for the Central Tribunal to decide. If relatives found that they could not procure coffins in which to bury their dead, they would have to go without. The community would have to be persuaded, however, that they were not essential.

The following is the fortieth list of members, licentiates, and students R.I.B.A. serving with the forces, the total to date being 69 Fellows, 110 Associates, 311 Licentiates, and 291 students:—Associates:—Dannatt, P. B., Lieut., R.E. Services; Hall, Vincent, Sanitary Section R.A.M.C.; Dickenson, W. F., Lieut., Hants Regt.; Foggitt, G. H., Royal Engineers. Licentiates:—Dukes, W. B., M.G.T.C.; Flinn, H. E., Officer Cadet Battalion; Sturges, H. J., R.A.M.C.; Wilkinson, Stephen, Lieut., R.F.C. Promotions:—Mr. S. Birkett (A.), gazetted Lieut. in the Lancs. Fusiliers; Sec.-Lieut. Cecil L. Wright (A.), R.G.A., from Artists' Rifles O.T.C.

Mr. Cecil Harmsworth, M.P., presided last week at the annual meeting of the British Garden Cities Association. According to the report, it appeared that Government departments, local authorities, building societies, etc., had availed themselves of the services of the association. Belgian Study Circles had been instituted, and a Circles Committee appointed, which, at the request of the Belgian Government, the association was assisting with a view to a compilation of plans and pictures designed to be of service in the rebuilding of Belgium. Belgian architects, surveyors, and engineers now resident in this country were being educated in the principles of garden cities and town planning. Lord Salisbury was elected president of the association, and Mr. Cecil Harmsworth was appointed chairman of the council.

A broken cast-iron pulley was recently repaired by pouring it full of concrete, according to H. S. Carpenter, in the *Engineering Record*. The pulley, which is one of a pair carrying the main elevator in a large stone-crushing plant, is 5 ins. in diameter, with a 20-in. face. In the failure nearly the entire rim was broken, but an extra pulley was not available, and it took some time to secure a new one. To avoid shutting down the plant in the meantime, a form was built in place around the remains of the old pulley, using perforated metal, faced with building paper for the rim and wood for the sides. The belt was left in place, and the whole interior of the form poured full of 1 : 2 : 3 concrete Pouring was finished at 6 p.m. on Saturday and the concrete pulley was put in service at 11 a.m. the following Monday. The job was a complete success. The belt runs directly on the concrete.

At the statutory general assembly of the Royal Scottish Academy, held last Wednesday, for the purpose of electing one painter to the rank of Academician in room of the late Charles Martin Hardie, the result of the voting was that Mr. Charles H. Mackie, painter, Edinburgh, was elected. Mr. Mackie, who was born at Aldershot Camp in 1862, is a son of the late Captain Mackie, 2nd (Queen's) Regiment. He was educated at Watson's College and Edinburgh University, and he entered the Edinburgh School of Art in 1878. For many years his pictures have been prominent in the Scottish exhibitions. He worked in France for some time, having a studio at Etaples, and later in Venice. Three of his works are in the possession of the Modern Arts Association, one having been presented by Sir John Stirling Maxwell. One of the others, "The Handmaid of Art," is a notable picture, exhibited some years ago, and presented by a number of subscribers; the third was purchased from the painter himself. Mr. Mackie was elected an Associate of the Royal Scottish Academy in 1902.

A Shrewsbury correspondent reminds us that St. Mary's spire fell February 11, 1894—twenty-two years ago last Sunday week. The congregation at evensong had a marvellous escape, as they had not long left the building when the disaster occurred. The fall followed a meeting which was held in the town with a view to raising a Shrewsbury memorial to the great Salopian, Charles Darwin, and it was suggested by the then incumbent of St. Mary's that it was a visitation of Providence because of the impious proposal. But, as was unkindly pointed out by an anonymous writer in the Press, the Vicar of the Church was conspicuous among his clerical brethren by absence from the meeting in question. Therefore, if the fall of the steeple was a visitation of Providence, the Divine wrath was directed against him, as the storm did no damage to any other church in the town. The appeal for the memorial, however, met with a very inadequate response, and the noble statue of Darwin, which adorns the front of the Public Free Library, was provided by the munificence of the Shropshire Horticultural Society, who refunded all the subscriptions.

Sir Aston Webb, R.A., in a paper on "Fire Insurance in Its Relation to Buildings and Architecture," which he read to the Insurance Institute of London last Monday night, said that London had been practically wiped out by fire four times, the last time being the Great Fire of London 250 years ago. Wide streets were a great means of protection from the spread of fire from one building to the opposite one. The City of London was a great sinner in this respect, many of the streets not being more than 20 to 25 ft. wide, which enabled the buildings opposite easily to catch alight. They certainly did not want another Great Fire of London, but were it to happen he believed that as the last Great Fire changed London buildings externally in four years from wood to brick, another would change them internally from wood to concrete.

Mr. E. W. Booth, temporary assistant in the Deptford borough surveyor's department, has been appointed surveyor to the Wallington and Beddington Urban District Council.

The death of Mr. William Gray, M.R.I.A., took place at his residence, Auburn Villa, Glenburn Park, Belfast, on the 6th inst., in his 86th year. Mr. Gray, who was a native of the South of Ireland, went to Belfast many years ago, and took a prominent part in matters relating to education, art, science, and archæology. He was president of the Belfast Naturalists' Field Club in 1879-80, and was one of the foremost advocates of the establishment of the Free Library and Art Gallery in Belfast. He was the author of several books on antiquarian and archæological subjects.

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CHIPS.

The Great Yarmouth Licensing Justices have passed plans for rebuilding the Gorleston Cliff Hotel. The cost is estimated at £30,000.

The death is announced at Brockhurst of Mr. F. C. Harvey, assistant surveyor to the Gosport and Alverstoke Urban District Council

The Lieutenant-Governor of the Punjab laid the foundation-stone of the new hall of the Society for Promoting Scientific Knowledge at Lahore on Tuesday, January 30.

From March 5 to 10 there will be an exhibition at the Mansion House of prints and other reproductions of pictures by famous Russian artists, illustrating Russian life and history.

A discount of 50 per cent. is to be allowed from March 1 on Government air-craft insurance premiums, except to insurances effected through the Post Office, and with a minimum premium of 2s. as heretofore.

In view of the appeal by the Government to abandon all avoidable occasions of travelling by rail, it has been decided to postpone the unveiling of the Rupert Brooke Memorial in Rugby Chapel until after the war.

Mr. Charles Trubshaw, for thirty years chief architect to the Midland Railway Co., died last Thursday at his residence at Derby, aged 76. Mr. Trubshaw designed the Midland hotel at Manchester, the station and hotel at Bradford, and the new station buildings at Nottingham. He retired in 1905.

The engagement is announced of Ernest T. Fletcher, lieutenant, Hussars, youngest son of the late Professor Banister Fletcher, F.R.I.B.A., and Mrs. Banister Fletcher, Anglebay, West Hampstead, and Muriel, only daughter of the late Mr. and Mrs. Frank Laver, of Westleigh, Westgate-on-Sea.

Once again we draw attention to the excellent work of the A.A. Active Service Committee, which consists of sending out necessities and comforts to members of the architectural profession and building trades serving with the forces. Gifts in money and articles will be gratefully received by Mrs. Maurice Webb, 37, Great Smith Street, Westminster, S.W.

Speaking on "The History of the Mansion House" at a meeting of the City Livery Club at the Mansion House last Friday, Mr. Charles Welch said that on its site there was founded in 1282 the Stock Market used by fishmongers and butchers. After the Great Fire it became the Covent Garden of its day. In 1739 the Corporation determined to erect the present building at a cost of £71,000.

Mr. Harry Ellis Wooldridge, who was Slade Professor at Oxford from 1895 to 1903, has died at his London residence after a long illness. His works include the large reredos in the Church of St. Martin, Brighton, and frescoes in the parish church of St. John, Hampstead. Among his works on music are a new edition of Chappell's "Popular Music of the Olden Time" and "The Polyphonic Period."

"The present stoppage of construction," pertinently remarks a writer in the *A.A. Journal*, "is in marked contrast to the period of the Napoleonic Wars—from the Revolution to Waterloo—when important developments in the arrangement of many London estates took place and fortunes were made and lost in building speculation." One is unfortunately instinctively reminded that there had not then been experienced four years of Mr. Lloyd George's finance, with its special attractiveness for builders!

The Eastbourne Town Council have approved plans submitted by Mr. F. G. Cooke, architect, for alterations at 27-29, Elms Avenue; by Mr. A. Ford, architect, for alterations at No. 1a, Terminus Road, 11, Silverdale Road, and 37, Upperton Gardens; by Mr. S. C. Scales, architect, for additions at Park Gates Hotel; by Mr. P. D. Stonham for alterations at 86, Terminus Road; by Mr. C. Breach, builder, for alterations at 78, Latimer Road; and by Messrs. G. Bainbridge and Son for a shed at the Upperton Red Cross Hospital.

In connection with the Royal Academy Winter Exhibition of Graphic Art, the council have arranged for a course of illustrated lectures on the various forms of engraving, to be delivered in the Galleries, without extra charge for admission, on Tuesdays and Thursdays, at 3.30 p.m. Yesterday Mr. Joseph Pennell lectured on lithography. To-morrow Sir Frank Short will speak on etching and line engraving; and these lectures will be followed by Mr. Campbell Dodgson on old engravings, Mr. F. Morley Fletcher on colour printing, and Sir Frank Short on mezzotint.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C., and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

***Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.

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Advertisements for the current week must reach the office not later than 3 p.m. on Tuesday. Front-page advertisements and alterations or stop orders for serial advertisements must reach the office by first post on Monday to secure attention.

RECEIVED—W. W.—C. S. and P.—I. C. S.—E. P. A. and Son—D. Bros.—B. Bros.—W. and Co., Ltd.—E. S. E. Co., Ltd.—L. W.—J. G. K. and Son—I. L. G. Co., Ltd.—W. H. S. and Son—J. B. and Co.—C. W. H.

J. K. S.—No.

CLIVE.—Please send.

PLASTER.—We know nothing of the firm.

COL. D.—Many thanks. Shall await them with interest.

PLEASE HELP US.—Will all readers oblige by ordering the BUILDING NEWS regularly, either direct from the office or through the same newsagent? Not merely to save themselves from disappointment, but to help us to regulate our output. From March 1 our supply of paper is again to be limited, and we are notified by the Paper Commission that at an early subsequent date it will be still further limited. Nor is this all. At the moment of writing we are advised by our papermakers that their stocks of material are exhausted, and that they cannot say when more may reach them. Our own stocks of paper have been necessarily small during the last twelve months, and it may happen any week that we shall be obliged to reduce the size of the paper very drastically. If so readers will bear in mind that it is not done merely to avoid loss, but simply because we cannot get paper. Meanwhile every sheet of paper saved is something gained, instead of being wasted on unnecessary "returns" from the newsagents.

TO ARMS!

1st LONDON ENGINEER VOLUNTEERS.
Headquarters, Balderton Street, Oxford Street, W.
ORDERS FOR THE WEEK, BY LIEUT.-COL. C. B. CLAY, V.D., COMMANDING.

OFFICER FOR THE WEEK.—Platoon Commander A. Gerard.

NEXT FOR DUTY.—Platoon Commander W. J. A. Watkins.

MONDON, FEB. 26.—Technical for Platoon No. 9 at Regency Street. Squad and Platoon Drill, Platoon No. 10. Signalling Class. Recruits' Drill, 6.30-8.

WEDNESDAY, FEB. 28.—Instructional Class, 6.15. Platoon Drill, Platoon No. 2.

THURSDAY, MARCH 1.—Platoon Drill, Platoons Nos. 5 and 6. Ambulance Class by M.O., 6.30.

FRIDAY, MARCH 2.—Technical for Platoon No. 10, Regency Street. Squad and Platoon Drill, No. 9. Signalling Class. Recruits' Drill, 6.25-8.25.

SATURDAY, MARCH 3.—2.45, Commanding Officer's Parade. Uniform.

SUNDAY, MARCH 4.—Entrenching at Otford. Parade Victoria (S.E. and C. Rly. Booking Office), 8.45 a.m. Uniform, haversacks, water-bottles. Midday rations to be carried. Railway vouchers will be provided.

EASTER CAMP.—This will take place at Esher, where a course has been arranged under Royal Engineer instructors. Names *must* be sent in to Orderly Room *not later than February* 28.

MUSKETRY.—For all Companies. See Notice at Headquarters.

NOTE.—Unless otherwise indicated, all Drills, etc., will take place at Headquarters.

TELEPHONE NUMBER.—The Telephone at Headquarters is now Mayfair 1969.

By order,
MACLEOD YEARSLEY, Adjutant.
February 24, 1917.

The Dublin Corporation invite tenders for a marble pedestal in the City Hall. It is intended to receive a bronze bust of the late Charles Stewart Parnell. The bust was formerly in the possession of the late Dr. Kenny, M.P., City Coroner, and is an excellent likeness.

Mr. T. W. David, a Cardiff timber expert, declares that wood pulp for paper-making can easily be produced at home, and cites the case of Glamorgan, where he says there are whole districts of waste land where timber for pulping could profitably be grown. We wish somebody would start and persuade British paper-makers to use the home-made pulp.

In a letter to the Brighton Town Council Mr. Austen Chamberlain, Secretary of State for India, says that his council has sanctioned the expenditure of £750 on the proposed Indian memorial. The Brighton Counsil have voted a like sum. The site is on the Downs close to the town, where the Indians set up a crematorium.

Again not a single house plan was before the Rochdale Corporation Building Committee on Wednesday. Two additions to works were approved—a new weaving shed at Messrs. J. Radcliffe and Company's Green mill, and a new boiler-house at Messrs. Kelsall and Kemp's Mason Street works.

Mr. J. H. Swainson, architect, of 1, Hill Street, Regent Street, Wrexham, has been appointed Diocesan Surveyor for the Diocese of St. Asaph, in conjunction with the previously appointed surveyor, Captain Gronwy R. Griffith, of Denbigh, whose time is taken up with his military duties, and for whom Mr. Swainson has been acting as deputy for the previous nine months.

The efforts of the Joint Committee of the Royal Institute of the Architects of Ireland and the Dublin Industrial Development Association to secure a permanent exhibit of Irish industries connected with the building trades, in the National Museum, having met with favourable consideration by the Department of Agriculture and Technical Instruction, it is interesting to review some of the earlier efforts to establish an exhibition, or museum, of Irish industries in Dublin

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COMPETITIONS OPEN.

March 3.—Water Supply and Sewerage Scheme (premium 5,000 pesetas—about £200), Manzanares, Spain.—Secretaria del Ayuntamiento, Manzanares.

LIST OF TENDERS OPEN.

BUILDINGS.

Feb. 23.—Certain Alterations to Nos. 5 and 6, Scrubbs Lane, in connection with fireproofing two front rooms of No. 6, to be used as an electric sub-station.—For the Hammersmith Borough Council.—L. Gordon, Town Clerk, Town Hall, Hammersmith.

Feb. 28.—New bathrooms, lavatories, etc., at the Louth County Infirmary.—J. W. Turner, J.P., Secretary, Louth County Infirmary.

March 1.—General Repairs, Painting, etc., to 37, Victoria Street, Norwich.—A. E. Collins, M.I.C.E., City Engineer, Guildhall, Norwich.

March 14.—Construction of Pumping Station Buildings, Chimney Shaft, Approach Road, and other works at Sheerness East.—For the Sheerness Urban District Council, in accordance with plans and specifications prepared by F. W. S. Stanton, the council's consulting engineer.—V. H. Stallon, Clerk, Council Offices, Sheerness.

ENGINEERING.

Feb. 26.—Supplying, delivering and fixing Steel Vertical Cross-tube Boiler, about 9 ft. high, 4 ft. diameter.—For the Woodford Urban District Council.—W. Farrington, Surveyor, Council Offices, Woodford Green, Essex.

Feb. 28.—Construction of two Masonry Dams across the Parbati River in respect of hydro-electric waterworks and irrigation schemes, amounting to about Rs.30,00,000, equal to £200,000 each; one near Budh, and the other between Bassai and Kaketo.—S. K, Gurtu, Member Board of Revenue for Irrigation, Gwalior Government, Moti-Mahal, Lashkar, Gwalior, Central India.

March 2.—Dredging work to be carried out in the river Itchen, Southampton.—For the Southampton Harbour Board.—J. E. Pailthorpe, Clerk, Harbour Offices, Town Quay, Southampton.

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

FENCES AND WALLS.

March 30.—Wrought-iron Gates and Fencing, for the Central Wharf and Quay Street Landing, Auckland, N.Z.—For the Harbour Board.—The Commercial Intelligence Department, 73, Basinghall Street, E.C.

PAINTING.

Feb. 24.—Repainting and Decorating St. Mary's Parish Church, Newry.—Designs and specification can be inspected at the office of Mr. S. W. Reside, Architect, Margaret Square, Newry. Tenders to be sent to the Rev. H. B. Swanzey, M.A., The Vicarage, Newry.

ROADS AND STREETS.

Feb. 23.—Granite macadam and chippings; Macclesfield macadam and chippings; limestone macadam and chippings; 6-in. grit stone setts; sanitary pipes (One Year).—For the Marple Urban District Council.—D. J. Diver, Surveyor, Council Offices, Marple.

Feb. 24.—Granite Slag and Tarred Macadam, to be delivered at various railway stations in the district. Team labour necessary in carting the material on to the roads where required (One Year).—For the Rotherham Rural District Council.—Oxley and Coward, Clerks to the Council, 6, Westgate, Rotherham.

Feb. 26.—Setts, Macadam, and other road materials (Six Months).—For the Bredbury and Romiley Urban District Council.—A. Plunkett, Surveyor, Council Offices, School Brow, Romiley.

Feb. 26.—Granite Slag, Tarred Macadam and Limestone, delivered to the various stations and wharves in the district (One Year).—For the Keynsham Rural District Council.—F. G. Whittuck, Clerk to Council, Keynsham.

Feb. 28.—Macadam, Tar Macadam, Chippings, etc., delivered to railway stations and canal wharves in the county (One Year).—For the Cheshire County Council.—W. Holland, County Surveyor, The Castle, Chester.

Feb. 28.—Supply of Granite.—For the Diss Urban District Council.—A. Cooper, Surveyor, The Terrace, Diss.

Feb. 28.—Making-up and paving with Slag (limestone will not be accepted) of certain private streets in the district under the Private Street Works Act, 1892.—For the Easington Rural District Council.—W. G. W. Noble, Acting Clerk, Council Offices, Easington, Easington Colliery, Co. Durham.

Feb. 28.—Construction of 1,000 super. yards of Pitch Grout Macadam Road.—For the Exeter Corporation.—T. Moulding, City Engineer and Surveyor, Exeter.

Feb. 28.—Supplying Whinstone, broken and unbroken, and broken annealed and common Slag, to be delivered, carriage paid, at stations within the district.—For the Flaxton Rural District Council.—J. Peters, Clerk, 4, New Street, York.

March 1.—Road Materials (Channel Island Granite, Channel Island Granite Siftings, screened: Pea and Farnham Gravel, Kentish Flints, Cockle Shells, Red Pit Sand, screened Thames Sand and Kentish Rag) (One Year).—For the Commissioners of H.M. Works.—Secretary, H.M. Office of Works, Storey's Gate, London, S.W.

March 1.—Materials and Work (One Year).—For the Wardle Urban District Council.—J. D. Hurst, Clerk, Council Offices, Wardle.

March 2.—Repair of District Roads (One Year).—For the Dorchester Rural District Council.—W. W. Reed, Clerk, 24, High West Street, Dorchester.

March 3.—Supply of from 1,500 to 2,000 tons of Broken X and XX Granite, from 1,500 to 2,000 tons of Broken X and XX Slag and best Slag rejection, and about 250 tons of Slag Dust and Chips for roads in the district.—For the Sibsey Rural District Council.—J. M. Simpson, Clerk, 28, Wide Bargate, Boston.

March 3-17.—Supplying Materials (One Year): Setts, Kerbs (local stone); Flags (local stone); Earthenware Pipes, Bends, Junctions, Taper Pipes, Traps and Gullies; Pitch and Creosote Oil; White Limestone Chippings; Hand-broken Granite and Granite Chippings; Portland Cement (British standard specification).—For the Heywood Corporation.—G. G. Bourchier, Town Clerk, Municipal Offices, Heywood.

March 5.—Supply of Road Materials, to be delivered at the following railway stations; Six-Mile-Bottom, Dullingham, Newmarket, Kennett, Swaffham Prior, Bottisham, Burwell, Fordham, Soham and Isleham (Great Eastern Railway), at times and in such quantities as may be ordered by the Council or their Surveyor.—For the Newmarket Rural District Council.—F. J. Blackbourn, Acting Clerk, Deva Chambers, Newmarket.

March 5.—Supply and free delivery at Sunbury railway station or a riverside wharf, at the option of the Council, of not less than 500 tons of Guernsey, Clee Hill, Bardon Hill or Charnwood Granite (broken to pass through a 2¼-in. ring; and of not less than 300 tons of Slag Tar-Macadam.—For the Sunbury-on-Thames Urban District Council.—C. E. Goddard, Clerk, Council Offices, Sunbury-on-Thames.

March 5.—Broken Granite, etc., for repair of highways within the Borough of Loughborough (One Year).—For the Highways Committee.—H. Perkins, Town Hall, Loughborough.

March 7.—Supply of 4,000 tons of 1¼-in. and 2-in. Granite, 500 tons of Granite Chips (small), and 1,000 tons of Broken and Unbroken Wymondham and Kentish Flints, to be delivered on or before September 29, 1917, at various places in quantities as required by the surveyor.—For the Blything Rural District Council.—H. A. Mullens, Clerk, Council Offices, Bulcamp, Halesworth.

March 7.—Highway Material and Carting (One Year).—For the Strood Rural District Council.—J. E. Povey, Clerk, Council Offices, Strood.

March 10.—Supplying Materials, Stores, Steam-rolling and Tractor Hire (One Year).—For the Durham County Council.—A. E. Brookes, County Surveyor, Shire Hall, Durham.

March 13.—Supplying Broken Furnace Slag, Broken Granite, Machine and Paraffin Oils, Castings, Bricks, Cement, Coal, Disinfectants, Stoneware Pipes, etc. (One Year).—For the Walsall Rural District Council.—W. P. Young, District Surveyor, Council Offices, Daw End, Rushall, Walsall.

March 17.—Broken Slag, Granite and Tar Macadam for roads (One Year).—For the Kiveton Park Rural District Council.—F. Hewitt, Surveyor, Council Offices, Kiveton Park Station, near Sheffield.

March 22.—Supply of about 2,980 yards of Flints, about 2,550 yards of Granite or other stone, and 60 yards of Gravel.—For the Chailey Rural District Council.—H. Kemp Walls, District Surveyor, North Common, Chailey.

SANITARY.

March 1.—Construction of about 400 lineal yards of 9-in. and 18-in. Earthenware and Cast-iron Pipe Sewers, with manholes, etc., at Allensbank Road, Gabalfa, in the Parish of Llandaff.—For the Llandaff and Dinas Powis Rural District Council.—M. Warren, Clerk, Park House, Cardiff.

STORES.

Feb. 26.—About 60,000 Rectangular Sleepers, 9 ft. by 10 ins. by 5 ins., cut from Scotch or silver fir, delivered on the company's trucks at any stations on their system; 30,000 Sleeper Blocks, 9 ft. by 10 ins. by 10 ins. (contractor to specify description of timber), delivered on company's trucks at their stores department, Oriel Street, Dublin, within six months from date of acceptance.—For the Midland Great Western Railway of Ireland Company.—P. A. Hay, Secretary, Broadstone Station, Dublin.

Mr. A. Nicholson, of South Carlton, has been appointed temporary surveyor to the Welton Rural District Council.

Mr. W. H. Matthews Jones, city surveyor of Chester, has been elected a member of the Institution of Civil Engineers.

Mr. J. S. Pickering, borough surveyor and water engineer of Cheltenham, has had his salary increased from £600 to £700 per annum.

Lady Robertson unveiled a war shrine at St. Luke's, Old Street, last Thursday, on which were the names of 93 parishioners who have fallen at the front.

An exhibition of etchings and dry-points by Mr. Muirhead Bone is being held at 22, Montagu Square, W., from February 18 to March 4 in aid of Mrs. Humphry Ward's scheme for providing Evening Play Centres for London children. The exhibition, which contains many works not exhibited before, is open daily from 11 to 6 and on Sundays from 2 to 6.

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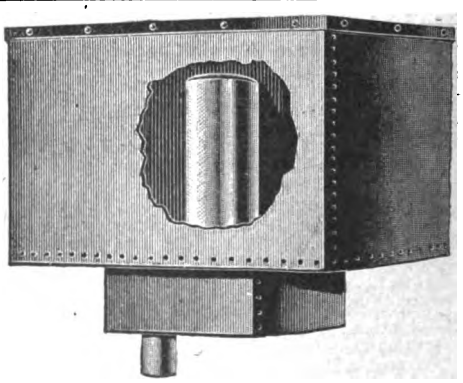

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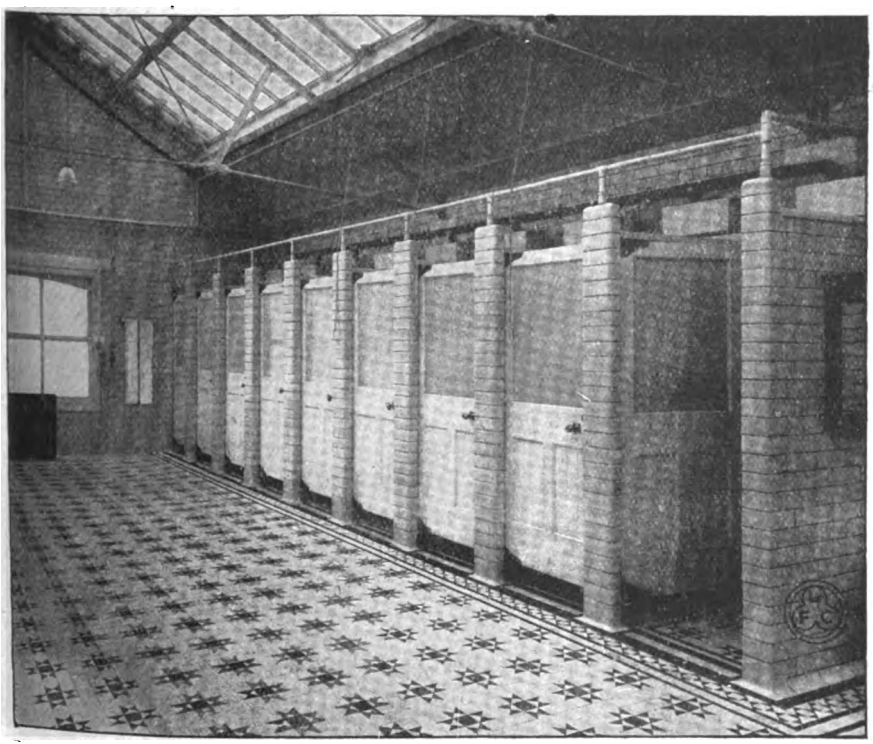

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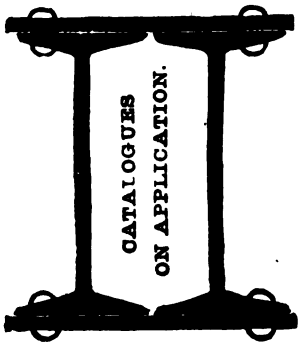

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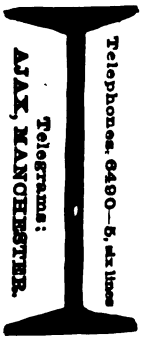

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February 28, 1917. Volume CXII.—No. 3243.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House. Strand, W.C.

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OUR ILLUSTRATIONS.

New Grammar School, Stockport. General view of entrance front and interior of the Great Hall, with two plans. Messrs. R. H. Spalding and E. G. Theakson, FF.R.I.B.A., Architects.

"Some Old Devon Churches," Upton Pyne Church Western Tower; West Worlington Church Spire and South Approach; Plastered Ceiling, south aisle, Exminster Church; and Screen in south aisle, West Worlington Church. Photographed by Mr. John Stabb.

Public Washhouses, McLeod Street, Gorgie, Edinburgh. Detail of the Washing Hall and Drying Chamber. Mr. J. A. Williamson, A.R.I.B.A., Architect to the City of Edinburgh.

Currente Calamo.

The importation of paper and paper-making materials is to be brought down very severely again. The importation recently, we are told, has been on the scale of 1,280,000 tons, and it has to be reduced by one-half to 640,000 tons. Half of this amount, it is said, will go to the printing and half to the packing trades. The effect on newspapers is already most serious, and we shall have to do one of two things—perhaps both—drastically diminish our size or increase our price. The matter is receiving our best consideration, but difficulties will attend the adoption of any course, which must be encountered, but not without careful preparation and more complete knowledge of the Paper Commission's new regulations than at present is obtainable. During the past twelve months we can only say that past restrictions have had the effect of increasing the cost of paper from 350 to 400 per cent. above pre-war prices; and that, as Lord Burnham said last Saturday at the meeting of the Newspaper Press Fund, "there had not been one exception to our being plunged into the chaos of waste and muddle which Government regulations seem inevitably to bring."

We congratulate the Royal Academy on its decision to admit photographs of architectural works and sculpture this year for the first time. The conditions laid down will be found elsewhere in the general regulations for the forthcoming exhibition, which opens on May 7. Whether photographs have an art value in themselves is a matter of difference of opinion, but that they are in many cases much more useful to architects as a faithful representation of work actually executed than fanciful perspectives of the sort we have had more and more of during the past few years, no one whose opinion is worth having will deny. Best of all, of course, is a really good line drawing, especially as regards details, and we are always thankful when we get such. Just now few architects have the time to make such, and in those cases a good photograph answers every purpose. Some of us know to whose influence this forward move is due, and are very glad that it has been exercised and responded to, not merely because it is a timely help to many of us, but because the Royal Academy *is*, after all, the really representative body of British architecture, as well as of the other arts, and it is good to see it recognising the necessities of the times.

The third British Industries Fair opened on Monday in the Victoria and Albert Museum and the Imperial Institute, and will remain on view till March 9. There are more exhibitors and the areas covered are larger than last year, the toy section being by far the largest. Toys hardly constitute one of the "essential trades" just at present, and we should have thought something might have been done this year for those which are, or will be as soon as peace comes; but the Board of Trade thinks otherwise. Anyhow, a word of praise is due to those who have organised the show, which is excellently arranged, and refreshingly free from the puffery and pretence which characterise some trade exhibitions. To us the most useful objects are shown at Stand B 30 in the Imperial Institute, where Lott's Brick Co., 26, Vale Road, Oxhey, Watford, show a variety of stone building blocks packed in various sized and priced boxes, with plans and drawings. Each box is numbered and progressive, and supplemental to the one preceding it, so that the student may advance gradually from the construction of the simplest cottage to the complete cathedral. The series has been specially designed by Mr. Arnold Mitchell, and is in every way infinitely superior to anything of the sort we have seen before, the designs and plans being based on really technical and scientific principles. Among the few other exhibitors likely to interest our own readers are Mr. W. Bailey, Stand C 9, who also shows some constructional toys, but made in grooved metal; Messrs. Carter and Co., Limited, of Poole, who have a selection of their well-known tiles and ceramics; and Messrs. Doulton and Co., Limited, Lambeth, whose array of chemical laboratory porcelain includes everything of the kind hitherto made in Germany, of far higher quality and fitness. Architects and others engaged in the design or management of technical institutes and similar establishments should make a point of familiarising themselves with this exhibit. It embodies a very real advance in a much needed direction, and is eminently characteristic of similar enterprise in more familiar directions which has ever distinguished the great firm it represents. We wish we could say as much for some of the exhibits of stationery and fancy goods, in which one must admit the superiority over the alien is not yet very apparent.

The Business Names Registration Act is already causing a great deal of trouble, and will, most probably, lead to litigation before its full effect is settled by the Court. As usual, it was very badly and loosely drafted, and there are many points to be cleared up. As the Act applies not only to trades but also to professions, its scope is very extensive under the word "Business." A person or a firm trading only in his or their own true surnames is exempt. But this must be done "without any addition other than his or their true Christian names, or the initials thereof." So if "John Smith" himself trades as "John Smith and Co." or "J. Smith and Co." he must register it as a business name, with true name separately stated. Then the Act requires the main particulars of registration to be shown in "legible characters" on all "trade catalogues, trade circulars, showcards and business letters, on or in which the business name appears." This is vague and is already causing trouble, but the better and safer opinion is that the words "business letters" would include memoranda, travellers' cards, invoices and accounts, as these certainly come within the aim and object of the Act. Limited companies are not included, so that the many alien enemies still trading in our midst, who do not love publicity, are now very busy registering themselves as one-man or private companies. The Government has promised to stop this hole, which they should do at once and retrospectively if the Act is to be of any use in this way. Of course the whole of our company law needs to be dealt with drastically. For the war has shown that it is by means of companies that the Germans have got so great a grip upon trades which both here and abroad are vital to our interests. This long delayed registration of business names is a good step forward, but much more has to be done with our loose company

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law and practice if we are ever to get and keep the control of British business.

Mr. Purcell Jones is showing in the Leicester Galleries, Leicester Square, W., some forty framed water-colour drawings in illustration of costumes for the theatre, and though quite rightly such studies make no claim as pictorial compositions, they are in their way perhaps none the less worthy of inspection. Like J. R. Planché, E. W. Godwin, William Burges, and other reliable authorities on historic or dramatic costume, Mr. Purcell Jones treats his drawings as practical diagrams or detailed guides for the dressmaker or tailor, the pose adopted by his figures being meant to display in the best manner the special cut and decorations of the particular costume illustrated. That insured, no further time is wasted upon finishing up the faces of the personages depicted, consequently they sometimes present a doll-like or lay-figure appearance with very pink cheeks and conventional expressions. Nearly all the female characters, like fashion plates, are set out in very tall proportions. The characteristic attitudes of some actors are in a few cases well hit off, not always, however, with refinement or elegant effect, such as in the case of "Cora Pearl" (17), who, elevating her lace-lined skirt chin-high, exposes her white stockings perhaps unduly, while she glances coquettishly from under her Early Victorian "straw." The artist had, of course, better material when drawing the dresses for the Italian Masque at His Majesty's, including some costumes designed by Lady Diana Manners for Mr. H. B. Irving (35). All this Haymarket series (35 to 39) is more or less consistently mediæval in type, and so helps theatrical business considerably as far as higher ideals and poetic romance are concerned. They are very different, for instance, from Miss Doris Keane's dress in white with its very pronounced and angular elbows, or the dresses in "The 1830 Ballet" (29-33), including a garden-temple scene with pillow-like rolling clouds set out after the manner of a market-fair japanned tea-tray. Possibly this is intentional as illustrative of the period. "The Hon. Lucinda Spottscouldnot" has a green flounced and hooped silk skirt quite worthy of her extravagant name.

We disagree *in toto* with the suggestion that the Tower of London is the proper place for the War Museum which, it is taken for granted, will be erected after the war. The building is fairly fully occupied, its associations are all with the past, its location is not central enough, and any collection there installed would in all probability degenerate into a mere sight-show. A new building is urgently called for, and, it is obvious, should be designed by an architect. We are too modest to enforce this dictum by any arguments of our own, especially at a time when the Government is "utilising" the services of architects by setting them to the most ordinary clerical work under military engineers whose knowledge of design and construction is as limited as their disregard of cost is expansive. We will therefore only quote the words of our contemporary *The Engineer* in its last issue:—"We want a new building designed now, whilst the artists and architects are fired with the feelings of the war, a building that will express all that the war means to us, a building democratic in essence, celebrating the triumphs of freedom won through the stress and bitterness of war by the united effort of free peoples. We don't want to be told that our architects are incapable of expressing great emotions. Frankly we don't believe it. We have great architects amongst us, men with noble artistic ideals, and if they are given the opportunity, if they are freed from the bondage of the municipal councillor, whose apotheosis of art is a memorial clock, they are capable of producing a building, a collection of buildings, that will at once express the dignity of war and the cohesion of all the peoples of the Empire who have lived and worked, have fought and died for the triumph of the cause that has always been nearest and dearest to the Anglo-Saxon race."

The war having temporarily claimed the London residences of the Duke of Buccleuch, the Duke of Devonshire, and the Duke of Westminster, the valuable collections of furniture which they contained have been deposited by their owners on loan in the Victoria and Albert Museum, and the public is thereby indebted to them for a highly important and interesting exhibition. The principal collection is that lent by the Duke of Buccleuch from Montagu House. It consists, for the most part, of French furniture belonging to the period of Louis XIV. to XVI., and includes a remarkable series of Boulle examples, pieces signed by Carlin and Joseph, chairs and screens covered with Beauvais and Gobelins tapestry, and many other valuable specimens. The collection lent by the Duke of Devonshire from Devonshire House consists almost entirely of furniture designed by William Kent, the architect of that house when it was rebuilt in 1734 after a fire in the preceding year. It includes about twenty typical examples of Kent's work, and thus will afford to students a unique opportunity of studying the characteristic style of this important artist. Among the pieces lent by the Duke of Westminster from Grosvenor House the most striking are a pair of Boulle armoires, similar to the well-known examples in the Wallace Collection and at Windsor Castle. The exhibition has been arranged in the Loan Court on the ground floor of the Museum.

There is a shortage of wood-paving blocks, and as there is no possibility of obtaining a new supply, and as the existing wood paving is getting worn in some thoroughfares in the metropolitan and provincial cities into a dangerous condition, an alternative method of repair has had to be devised. An experiment is to be made, it is stated by *Municipal Engineering*, by taking out the bad patches of wood paving originally 5 ins. in depth and filling up with 3½ ins. of bituminous concrete, which, of course, sets very quickly, and surfacing this with asphalte carpeting 1 in. or 1½ ins. If the experiment succeeds, remarks our contemporary, it will have far-reaching results, for it will mean the substitution as a foundation of a bed of asphaltic concrete instead of cement concrete, and to the public a great advantage, for the streets will only have to be closed a few days when wood, asphalte, or sett paving is to be laid, as against weeks, which is the time now occupied when concrete is used. That is true, and we hope as well that wood will be less and less used in the future, and asphalte substituted. During the recent filthy condition of the streets no one can have failed to remark the comparative cleanliness of the asphalte roadway, even under adverse conditions, contrasted with the filthy, sodden wood blocks.

HENRI PAUL NENOT.

Few careers have been of more interest from every point of view than that of the distinguished Frenchman whose election as the recipient for 1917 of the Royal Gold Medal, given by the King, takes place at the R.I.B.A. on Monday next, and a selection of whose best-known works we shall illustrate in our next issue. It has been our good fortune, during the last sixty-three years, to congratulate many worthy winners of the Medal, but never under circumstances more creditable to them, or more grateful to the feelings of the general body of British architects and all interested in architecture, in whose name we are privileged to offer M. Nénot our heartiest felicitations. In ordinary times those would have been simply his due, so well founded are his claims; but to-day their tender is concurrent with an outburst of fraternal esteem which no other recipient—however worthy on purely professional grounds—could have elicited. For M. Nénot is not simply the embodiment of all we associate with the best and highest in French architecture, but he is in every way the personification of the patriotism that has made France irresistible and has compelled the admiration of the civilised world. Long years ago, in early youth, with many another gallant Frenchman, he sacrificed everything to join the great national uprising against the German hordes. With him and them stood together more than one brave Englishman whose names we revere, and France still remembers with affection. But it was not then our privilege to rally as a nation to the defence of civilisation in Western Europe against barbarism. To-day it is otherwise. And amid all the heroic Englishmen who are battling on many fronts for liberty and the defence of the victims of German brutality, none bulk more largely, proportionately to their number, than British architects, none, therefore, are bound more intimately together in the kinship of art and arms with Henri Paul Nénot, and no others have a keener interest in his achievements and his history.

Born at Paris, in the Court of Miracles, in 1853 of Parisian parents of the third generation, Henri Paul Nénot's vocation for architecture manifested itself unmistakably in early infancy, for at the age of nine years we find him drawing for his own amusement an exact and detailed plan of the pension of Villiers de Bel, where his parents resided. At the age of thirteen he entered the atelier of Lequeux; at fifteen, in 1868, he entered the Ecole des Beaux Arts, and quickly gained the prize Muller-Schœné, reserved for the

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pupil of the second class having scored the greatest success during the year. When the war of 1870 broke out, his youth—he was only seventeen—did not hinder him for a moment from taking his part as a franc-tireur of the Seine in the defence of Paris, and in the attack of Bourget he performed prodigies of valour and gained the Military Medal.

At the end of the war Nénot returned to his studies, entering the atelier of Pascal, and, under his direction, having taken a position in the first class of the Ecole, and engaged simultaneously in practice as an architect, determined to find therein his course of life.

The conscription brought him again under the flag, this time in the artillery, and his old comrades marked with pride

HENRI PAUL NÉNOT,
Royal Gold Medallist, 1917.

the medal on his uniform which he had so bravely won. He left the regiment a sous-lieutenant. Returning to civil life, he engaged, with his comrade Oudinet, in a competition for the erection of the College de Huy, Belgium, carrying off the first prize. In another competition for the Théâtre des Arts at Rouen he obtained the second prize. And in 1877, at the age of 24 years, he won the Grand Prix de Rome. As the *pensionnaire* of the French Academy he was not for an instant inclined to sleep on his laurels. Each year of his studentship was marked by some interesting work, or by travel in Italy, Greece, Turkey, and Egypt, fruitful in numerous papers descriptive of the historic edifices of those countries or their remains.

The time of his return to France was concurrent with an international competition for the monument to Victor Emmanuel at Rome, in which 240 competitors engaged. The first prize was awarded to Nénot, and although as a foreigner the erection of the monument was not entrusted to him, the sum of 50,000 francs which was attached to the prize became his; and, thanks to that magnificent windfall, he was able to take part in the competition for the new Sorbonne. Here again he won the first prize. It was feared at first that he would be debarred from carrying out the work on the ground of his youth; and probably, but for the generous and warm intervention of Ch. Garnier and of Vaudremer the fruit of his magnificent success had escaped him, and Paris had lost one of the brightest jewels of her artistic crown. All obstacles, however, were overcome, and Nénot set about his work; and after seventeen years of colossal labour Paris was endowed with a monument that is the envy of the world.

Recognising his services, the French Government nominated him Chevalier of the Legion of Honour in 1885, Officer in 1895, and Commander in 1900. In 1895 the Academie des Beaux Arts called him to the Institut of France. In 1900 he received the Grand Prize of the Universal Exhibition. In 1903 the Central Society of French Architects, which had awarded him its Grand Medal in 1882, made him its President.

Of Nénot's principal works, the most famous are the New Sorbonne, the Institut Océanographique, the Banque Dreyfus, in the Rue de la Banque, the offices of the General Transatlantic Company, of the "La Nationale" Assurance Company, and of the International Company of Wagon-lits. He is Inspector-General of Civil Buildings and National Palaces, and a long list of lesser works testifies to the continued activity and maturity of his genius.

Enjoying the homage of all his fellow countrymen, by whom his achievements are counted as among the greatest contributions of his time to the glory of France, it is a gratification to all of us to record the tribute that has been so judiciously paid him by the award of the Royal Gold Medal.

SOME MORE OLD DEVON CHURCHES.

(With illustrations.)

Mr. John Stabb, of Torquay, has been so successful with his first volumes of photographs and detailed descriptions of the churches in Devonshire, including their rood screens, pulpits, fonts, and stalls, that he has now issued a third book* as a supplementary itinerary dealing with over fifty more examples, and thus making an aggregate of 264 ecclesiastical buildings described more or less completely, with a total of 400 illustrations comprised within his three volumes. The subjects are diverse and mostly typical, though by no means merely of local importance. The four examples we have selected will best illustrate the quality of the rest.

From Exminster a view is given of the richly decorated plaster ceiling of the south aisle side chapel. This barrel vault is spaced into squares set out diagonally and ornamented with figures in stucco of St. Matthew; St. James the Less, with club and book; St. Thomas, with spear and volume; St. John, with a chalice; St. Mark, with lion; St. Simon, with knife and book; St. James the Great, with staff, water-bottle, and a pilgrim's hat, ornamented by escallop shells; St. Peter, with a key; St. Andrew, with his cross; St. Matthias, with battle-axe; St. John, with eagle; St. Bartholomew, with knife; St. Luke, with ox; and St. Judas, the fifteenth Bishop of Jerusalem, according to Eusebius. Carvings of the Nativity, the Baptism, the bearing of the Cross, and the Resurrection are set around the mural space over the east window of this chapel. The local guide-books fail to do Exminster Church justice, but it is well worth a visit from Exeter, and there is a railway station quite close on the G.W. line. The oak screen of five bays in front of the chancel is unrestored, and the doors are missing. The parclose and side aisle screens, however, are *in situ*. The rich tomb, dated 1607, on the north wall of the sanctuary is of Elizabethan character, richly treated, and being of fine monumental scale is well worthy of the special plate devoted to it; also, the general interior view of the nave, looking east, is a good one.

The south aisle screen at West Worlington Church is perpendicular in treatment, having arched lights and solid spandrils ornamented with carving enclosing rectangular framing, simply but prettily moulded; the cornice, having a cabled member, by no means common. The door panels have linen-fold designs. Old bench ends furnish the nave and aisle, all carved with geometrical patterns and floral enrichments. This unsophisticated village is six miles north-east of Lapford Station, on the L. and S.W. Railway. We give the exterior of its church with the twisted spire covered with shingles, set at the west end of the building. This old tower contains six bells. The approach to the church by way of an arched opening through the old thatched cottage makes an uncommonly picturesque subject worthy of a water-colour.

Our fourth illustration shows the fine square west tower of Upton Pyne Church, three and a-half miles north of Exeter. Over the western doorway is a figure of Christ in benediction, and on the south front is sculptured a representation of King David. Statues of the Evangelists occupy niches at the corners of the crowning parapet. The interior is rather spoiled by modern work, including a garish reredos to the Earl of Iddesleigh, 1887, as well as the Stafford Northcote windows of the dull period of 1850, 1851, also 1887. Some old glass, however, exists in the south aisle illus-

* "Some Old Devon Churches: Their Rood Screens, Pulpits, and Fonts." By John Stabb. 1916, Vol. 3, 8vo. (London: Simpkin, Marshall and Co.)

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trative of the Agony in the Garden, the Crucifixion, and our Lord falling beneath the Cross on the way to Calvary. The Larder Wall tombs occur below this window in memory of a former owner of Pynes, A.D. 1520, and also of Humphrey Larder, 1588, and Margaret, his widow, 1604. There is a lych gate in the churchyard, and the remains of the ancient parish cross still exist at Upton Pyne.

The alphabetical order in which the descriptive text is arranged facilitates ready reference. Following it, we may briefly name some of his subjects, commencing with Abbots Dickington, which has a wall monument to the Pollards, 1710, and the patched remains of good old glass in the east window. Fonts are shown from Ashwater, Bondleigh, Bradford, Bradworthy, Bridgerule, St. Petrock, Dartmouth, Honeychurch, Milton Damerell, St. Andrew's, Plymouth, Sheepwash, Shillingford, Sutcombe, Tetcott, and Torre, near Torquay. Mostly these are perhaps more curious than beautiful. The pulpits are very varied, such as Bulkworthy, Newton St. Petrock, St. James's Chapel (reading desk), Okehampton; Pancraswyke, Shebbear, Sutcombe, and a very uncommon balustered made-up sort of pulpit in Bradworthy Church, carried by cast-iron-looking posts.

Bench ends are garnered from North Tawton, with finer ones at Stockleigh, Sutcombe, and Thornbury. The rood-screen at Sutcombe shows excellent panel carvings, more nearly like the type so distinctive of Devonshire merit, but the principal examples of the screens of this notedly rich county have already appeared in the previous volumes as well as in his "Devon Church Antiquities." His present book gives the very old stone carved Agnus Dei, built into the west wall of the porch at Holsworthy, of which, it appears, no record is available as regards its original position. From Cheriton Fitzpayne a photograph is included of a remarkablly free piece of local carving, somewhat crude in manner and mixed in style, but exceptionally curious and interesting, with angels intermixed with foliations, belonging to a group of capitals. The stocks at Kingskerswell, on the Torquay line, are unusual, as they have holes for the fingers as well as the ordinary apertures for the ankles. This church possesses some very bold recumbent old effigies of the Dinham family. Some of them have been mutilated, but their mantlings and heraldic details are fine, with good draperies. The frontispiece shows some statues in niches from Plympton St. Mary's Church.

ROYAL ACADEMY EXHIBITION.

OPENS MAY 7, CLOSES AUGUST 11.

NOTICE TO ARTISTS, 1917.

TIME FOR, AND MODE OF, SENDING IN WORKS.

All Works intended for the Annual Exhibition of the Royal Academy, *Must be Punctually Sent there on One of the Days fixed for their Reception.* These days this year will be:—

Water Colours, Pastels, Miniatures, Black and White Drawings, Engravings, Architectural Drawings and Photographs of Buildings and Architectural Sculpture, Friday, March 30.

Oil Paintings, Saturday, March 31, and Monday, April 2.

Sculpture, Tuesday, April 3.

PHOTOGRAPHS IN ARCHITECTURAL ROOM.

By a Special Regulation for the Summer Exhibition of 1917, photographs of architectural work will be admissible this year. The size of the photographs must be not less than 12 in. by 8 in.; they should be framed in slight wood frames, with or without mounts, which may be tinted. The buildings shown must have been erected within the last ten years. More than one photograph of the *same* building may be included in one frame.

Photographs of Architectural Sculpture will also be admitted under similar conditions.

No work will under any circumstances be received before or after these specified dates.

All works must be delivered at the Burlington Gardens Entrance. None will be received at Piccadilly Entrance.

Hours for the reception of works, 7 a.m. to 10 p.m.

All Works sent from the country or from abroad must be consigned to an Agent in London for delivery at the Academy, *unpacked*, on one of the appointed days. *Account should be taken of the present difficulties of transit.* No Works in cases will be received; nor will the expenses of carriage be defrayed by the Academy. The attention of Foreign Artists and of English Artists residing in the country and abroad is especially called to this regulation.

No photographing or copying of Works will be permitted on the premises of the Royal Academy.

MODE OF DESCRIBING WORKS.

All the Works sent by each Artist must be entered on a printed Form duly filled in with the Name (Christian and Surname in full, *signed by the Artist*) and Address of the Artist, the Titles and Descriptions of the Works as they are to be inserted in the Catalogue, and the Price if it is desired to place them on Sale. These Forms must be sent under cover addressed to "The Secretary." *No Advertisement, Unnecessary Quotation, or Narrative can be admitted.*

At the back of each Frame must be written the Name and Address of the Artist, with the Title or Description of the Picture, and the Number (if there be more than one) to which it refers in his or her List. This information must also be repeated *with great distinctness and accuracy* on a Label securely attached by a string to the top of each frame, and made to hang over in front, as also to each piece of Sculpture.

It is necessary that these Regulations, more especially the last, should be strictly complied with, in order to avoid delay and inconvenience, as well as inaccuracy in the Catalogue.

The Forms and Labels can be procured (*during the month of March only*) from the Academy. Applications for them made by letter must be accompanied by a *stamped and addressed* envelope for their enclosure.

NUMBER OF WORKS ALLOWED.

No Artist is allowed to send or exhibit more than THREE different Works.

SIZE OF FRAMES, MARGINS, ETC.

Each Picture or Drawing must be in a separate Frame, or *if* a series of Drawings from one Story be at any time admitted in the *same* Frame, they must be enumerated as distinct pieces. A case of Sculptured Gems will be considered as one Work, provided the size of the case does not exceed six inches by five inches; and a case of Medals or Plaques, each of which is not more than seven inches in its widest dimensions, will be considered as one Work, provided the size of the case does not exceed three feet by four feet. *Miniatures must be in separate frames, uncased, and enumerated as distinct pieces.*

All Pictures and Drawings must be in gilt frames. Miniatures in frames set with jewels are inadmissible. *Oil Pictures must not be sent in under glass*, but any Oil Picture not more than 30 square feet superficial measurement obtaining a place on the line may have a glass put over it if so desired on an appointed day before the opening of the Exhibition, of which due notice will be given. Excessive breadth in frames or margins, as well as projecting mouldings, may prevent Pictures and Drawings obtaining the situation they otherwise merit. *The Frames of Engravings and of Works in Black and White must not exceed one inch in breadth.* Oval frames should be avoided, as they are difficult of arrangement. Reliefs should be framed.

WORKS INADMISSIBLE.

No Works which have been already publicly exhibited in London, or which have not been executed within the preceding ten years; no Copies of any kind (excepting Paintings in Enamel, and Impressions from unpublished Medals, in which case the name of the original Designer must be specified); no mere Transcripts of the objects of Natural History; no realistic models of ships or of other inanimate objects, except architectural models of buildings; no Vignette Portraits in Oil; and no Engravings or Etchings that have been published six months, can be received.

SELECTION OF WORKS.

All Works sent for Exhibition are submitted to the judgment of the Council, whose decision is final, and is officially communicated by letter to every contributor.

SALE OF WORKS.

The Prices of Works to be disposed of may be communicated to the Secretary, and will be entered in the Price Catalogues placed in one of the Galleries. *No change in the Price of a Work can be entered in the Price Catalogue after the Non-Members' Varnishing Day until the following Monday, the Opening Day of the Exhibition. Nor can any subsequent change be entered until the day after notice of it has been received.* Communications with regard to the Price and Sale of Works must in all cases be made by the Artist, and be addressed, in writing, to "The Secretary." All purchases will be registered, but the Academy can undertake no responsibility with regard either to the payment for the Works purchased or for their delivery to the purchaser.

CLOSE OF THE EXHIBITION. DELIVERY OF WORKS.

Before the closing of the Exhibition every Artist will receive a separate Printed Order for the delivery of each exhibited Work. This order must be properly filled in and signed by the Artist, and presented by the person sent to claim the Work, who must sign a receipt for it in a book provided for the purpose. No Work will be delivered up without the production of the Order. The Academy will not undertake to pack or forward any Work.

All Works must be removed within ten days from the closing of the Exhibition.

PRIVILEGES OF EXHIBITORS.

Each Exhibitor is entitled to a Ticket of Admission to the Exhibition, as also to the ensuing Winter Lectures and Winter Exhibition of Old Masters. These tickets can only be obtained by personal application at the Royal Academy.

When Works are described as the *joint* performance of *several* Artists, the first mentioned in the description will alone be entitled to the above Tickets.

MODERN FIREPROOF CONSTRUCTION.

BY W. W. PEARSE, C.E.*

There are two distinct types of modern fireproof construction, known as "steel skeleton construction" and "reinforced concrete."

The "steel skeleton construction" has, without doubt, held first place up till to-day, due to the fact that the steel work can be run up to almost any height in an incredibly short time; the balance of the construction follows immediately. Sometimes—in fact, generally—the brick and stone work are started at different storeys, the upper part frequently being finished before the lower storeys are commenced. This is usually caused by the lower storeys being built of stone, a material more difficult to get.

Buildings up to twelve storeys in height are generally built in what is known as curtain wall construction, which means that the walls are self-sustaining. This usually applies only to the side walls, the front being almost invariably built of skeleton construction, which means that at each floor the brickwork is supported.

Buildings of twelve storeys in height are usually erected inside of one year. It will take about one month to excavate, another month to set the concrete footings and the grillage; the balance of the steel work will then be erected at the rate of approximately one tier per day, making about two weeks' time when the steel work is up to the thirteenth tier. The rivetters are usually about

* City Architect and Superintendent of Buildings, Toronto, before the Insurance Institute of Toronto, January 18, 1917.

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one week behind the erectors; the brickwork and floor arches are usually about two tiers behind the iron men. It will then be seen that this leaves considerable time to put the finishing touches on the building to complete inside of the year.

Steel work has been able to overcome all the difficulties of construction caused by wind stresses and tremendous dead loads, and, in my opinion, will never be superseded by any mode of construction for buildings more than twelve storeys in height. This is particularly true when you consider that practically all the material used in these modern buildings is fabricated at the shop, all marked for erection; the foreman of the different trades is furnished with drawings which show where every piece is to go. This is true for practically all trades, such as stone work, terra cotta front work, steel work, plumbing, heating, etc. By this method these huge buildings are rapidly and economically constructed. Another good quality is that they are very readily inspected, both in the shop and in the field, and each individual unit carefully calculated and constructed to meet the stresses coming thereon.

Referring to the reinforced concrete buildings, this type of construction has undoubtedly come to stay, and I might refer you to some of the modern buildings that are being erected in Toronto, one being the Trusts and Guarantee Building, on Bay Street, which is eleven storeys in height, having girders for one storey built of concrete of the full depth of the storey and carrying interior columns which have considerable loads coming thereon. This type of construction is what is known as beam and girder reinforced concrete—in other words, reinforced concrete beams and girders take the place of steel beams and girders in the steel skeleton construction.

Another type is what is known as the four-way flat-slab construction. An example of this construction is well illustrated in the new mail order building of the Robert Simpson Company, and I might add that the City Architect's Department, in conjunction with the University of Toronto, have conducted some very satisfactory tests on this type of construction, and which I hope to have published later.'

Another type of concrete construction is the new Eaton factory building which is being erected on Downey's Lane and Alice Street. This building is a twelve-storey one, and is a combination of flat-slab construction and skeleton steel. The columns are built of steel work of such shape that the concrete when poured around them reinforces them, and we have a steel column reinforced with concrete, whereas in the Simpson building we have a concrete column reinforced with steel. The Eaton building, then, has floors constructed on lines similar to the four-way type of construction.

In considering the use of concrete and steel I have found that usually the engineer is biased one way or the other. Sometimes the engineer is trying to sell steel, and naturally he uses steel when concrete would be more economical, and the same holds true with the concrete engineer; he oftentimes will build prodigious girders, etc., of concrete when steel would be much lighter and stronger.

The different floor systems are almost infinite, but they usually resolve themselves down to terra cotta, brick, gypsum, cinder, or stone concrete. The terra cotta is usually built of either flat or segmental arches, and so designed as to cover the bottom flanges of the steel beams. Brick is almost invariably built in row-lock arches, and is never used except where very heavy loads are to be used; then these are very carefully tied together with steel tie-rods. Tie-rods are also used in the terra cotta arches to take up the outward thrust on the wall panels. Gypsum is usually used with some type of reinforced wire meshing or expanded metal, and is then poured, four inches thick, on top of previously arranged wooden forms. Cinder and stone concrete are also used that way. The forms are so arranged that the concrete will cover the bottom flanges with about two inches of material.

Mr. Pearse concluded his article by illustrating, with lantern slides, various types of building construction. One of these showed a typical engineer's floor plan of an ordinary loft building, 50 ft. wide by 90 ft. long and sixteen storeys high. The beams were arranged to form three panels. This method was adopted in order to reduce the bending moment on the girder, for if a central load had been applied it would have increased the bending of the girder considerably. The columns were arranged so as to reduce the span of the girders and the wall columns, so as to give the greatest resistance to bending due to the eccentricity of the dead and live loads; also to resist the bending caused by the wind loads. This type of construction is self-sustaining. In other words, the walls between the columns are supported at the foundation. One section showed skeleton construction—that is, a wall that is carried at every floor. This is a much more expensive type of construction than the curtain wall type, due to the fact that there has to be steel added to carry the walls; then all the brick load has to be taken by the columns. This type of construction for a building of the size shown would make a difference in cost of between three and four thousand dollars in the steel work, and would add an additional cost to the brick work of about seven hundred dollars; so it is readily seen that for a building, say up to sixteen storeys in height, curtain walls are much cheaper than the skeleton type of construction. The present Toronto by-law does not allow curtain wall construction, though its use is allowed, due to the fact that 90 per cent. of all the buildings in New York City up to twelve storeys in height are of curtain wall construction, which Mr. Pearse considers a sufficient precedent.

Another slide showed a floor system used in fully 75 per cent. of the loft buildings in New York City, composed as follows:—A wire mesh is usually put across the top of the "I" beams (preferably continuous); the forms are placed underneath, and four inches of cinder concrete of 1:3:5 mix is then poured for a floor slab. On top of this are placed wood sleepers, spaced about two feet centres, and filled in with what is called a dry mixture of cinder concrete. To these sleepers is then nailed the wood flooring. This gives what is called a top system, the ceiling having a beamed effect. This, of course, lightens the load on the beams and columns, and is much cheaper than either terra cotta or stone concrete. The question of fire resistance is quite a debatable point. Mr. Pearse stated that he had written to Chicago, Philadelphia, and New York, requesting them to state if they had ever found any buildings of this type of construction showing deterioration which the ordinary terra cotta or stone concrete did not show, and in all cases the reports have been favourable, providing pipes through which water or other liquids are to pass were covered with a sufficient quantity of cement to prevent any moisture from setting up a chemical reaction with the sulphur in the cinders.

Other slides showed a skeleton diagram of the approximate method of figuring the reactions on columns due to the wind; the usual method of getting up a column schedule giving the loads; a method of cantilever construction; the usual type of foundation which is carried down to rock and is composed of piers of concrete anywhere from 10 ft. to 50 ft. in depth; a cast-iron base which is often employed; a rough sketch of the ordinary type of gusset plate base which is quite popular with the structural steel engineers; a built-up steel base, constructed of channels and plates rivetted together, having bolts and separators and steel diaphrams placed under the centre of the columns; an analysis of the wind stresses taken at the fourth floor; the bending moment diagram of the steel columns caused by the wind; the bending moment of the girders; a popular bracket to resist the bending moment of the wind; a heavy wind bracket, very popular with the American Bridge Company and other construction companies doing heavy work; the usual column splice for a Bethlehem column or angle or plate column; the method adopted in calculating the stresses in a column when an eccentric load is applied; a modern fire tower and the type of old staircases; and a few formulæ for reinforced concrete.

NATIONAL SERVICE VOLUNTEERS WANTED.

It is officially announced that on the form of offer to be used by volunteers for National Service, copies of which can be obtained at any post office, twenty trades are mentioned for which male volunteers between the ages of 18 and 61 are specially wanted. For the further guidance of volunteers, the Director-General of National Service has issued a more detailed list of trades and occupations of primary importance. The list will be revised from time to time as the circumstances of the several trades require. Male National Service volunteers will not, as a rule, be supplied as substitutes in any occupation which can be suitably performed by women.

Among the trades listed which more immediately concern our own readers are:—

BUILDING AND WORKS OF CONSTRUCTION.

Building trade, Government work, or licensed work for war purposes.

WOOD-WORKING.

Felling, hauling, sawing, and creosoting of timber, saw sharpening and setting, manufacture of wood wool.

POTTERY AND GLASS TRADES.

Chemical ware, stoneware, and fireclay manufacture, furnace firebrick (including canister and silica brick), manufacture of optical and chemical glass, manufacture of optical lens and prism-making, other glass manufacture (except table and decorative ware and bottles for beer, wine, spirits, and aerated waters).

PUBLIC UTILITY SERVICES.

Police, fire brigades, salvage corps, electrical generating stations, tramways, omnibuses and char-à-bancs in connection with munition work, gasworks, waterworks, asylums and hospitals, gravedigging.

ARCHITECTS' OFFER OF ASSISTANCE.

A representative deputation, including members of the various architectural bodies in the Kingdom, waited last week upon Mr. Neville Chamberlain, Director-General of National Service, to urge the utilisation by the State of the special kind of work which the architect's training fits him for. The spokesmen were Mr. Ernest Newton, A.R.A., President of the Royal Institute of British Architects; Mr. Reginald Blomfield, R.A., past-President of the same body; Sir Aston Webb, R.A.; and Mr. John Bradshaw Gass, F.R.I.B.A., President of the Manchester Society of Architects.

Mr. Newton said, though their knowledge and experience would have enabled them to save the State much delay and waste, architects as a body had not been made use of. It was now late in the day, but the deputation, believing that it was more economical and practical to put men to the kind of work for which their knowledge and experience qualified them, offered their services to the Director-General to make of them the best use he could in his scheme of organisation, promising him their best help.

Mr. Neville Chamberlain received the deputation sympathetically, and promised consideration of the points which had been placed before him.

Mr. Peter M'Muldrow, Croxteth Road, Liverpool, timber merchant, has left £27,920.

Mr. W. F. Loveday, borough surveyor of Stoke Newington, has received a commission, with the rank of captain, in the Road Battalion, and during his absence Mr. C. L. Strike will be acting surveyor.

The death has taken place at his residence, 4, Goodman Terrace, Hunslet, Leeds, of Mr. John Ferguson, a well-known builder and contractor. Mr. Ferguson, who was sixty-nine years of age, leaves a widow, two sons, and three daughters, both sons being in training in England.

Complaint was made by a builder before Tottenham Tribunal last Thursday that a workman classed C3, for whom he obtained six months' exemption, had been ordered by the military to register at a Labour Exchange, and was promptly put on munitions. The builder, who was on Government work, had no alternative but to ask exemption for a workman in Class A, and the tribunal granted three months.

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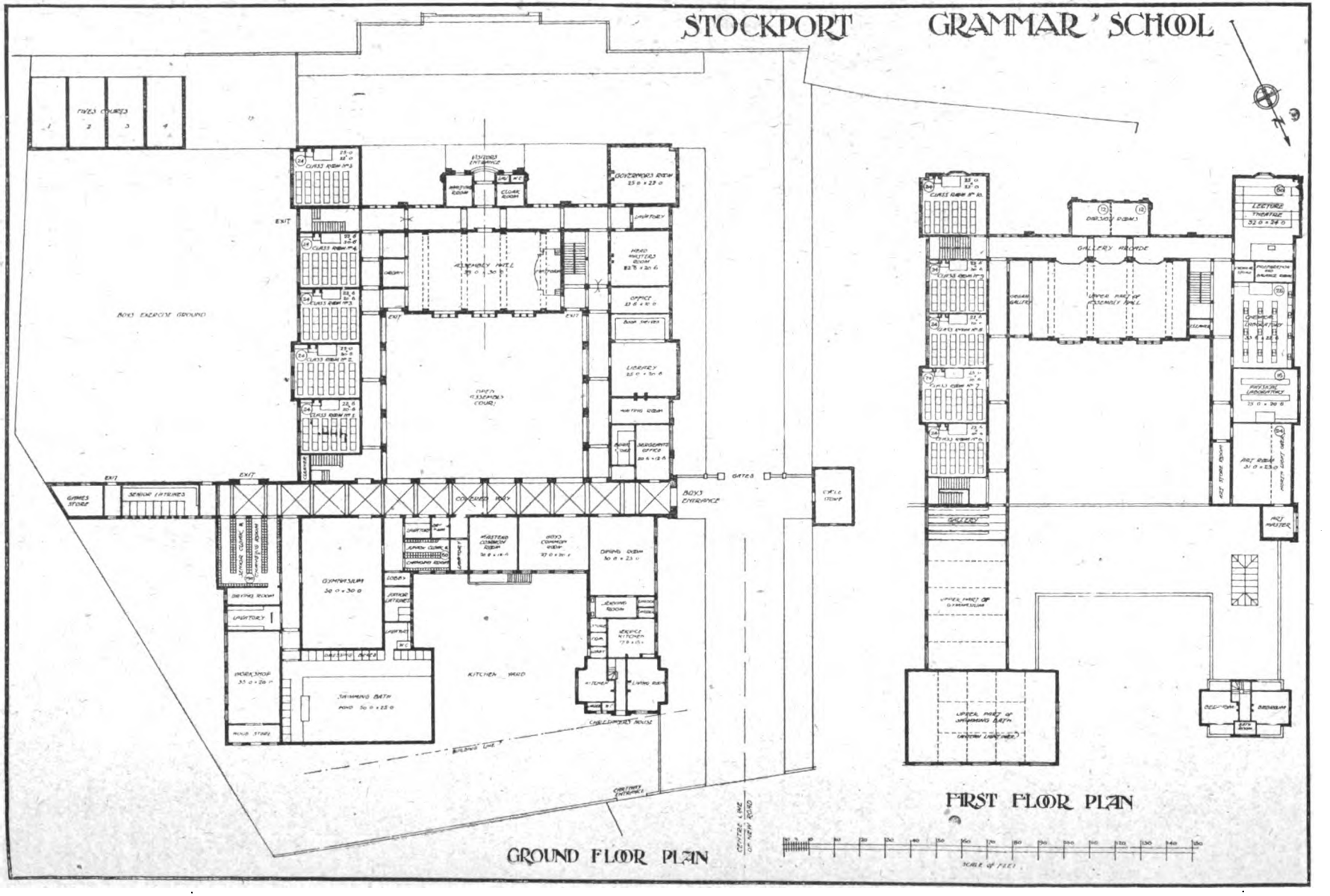

STOCKPORT GRAMMAR SCHOOL.—Messrs. Reginald H. Spalding and Ernest G. Theakston, FF.R.I.B.A., Architects.

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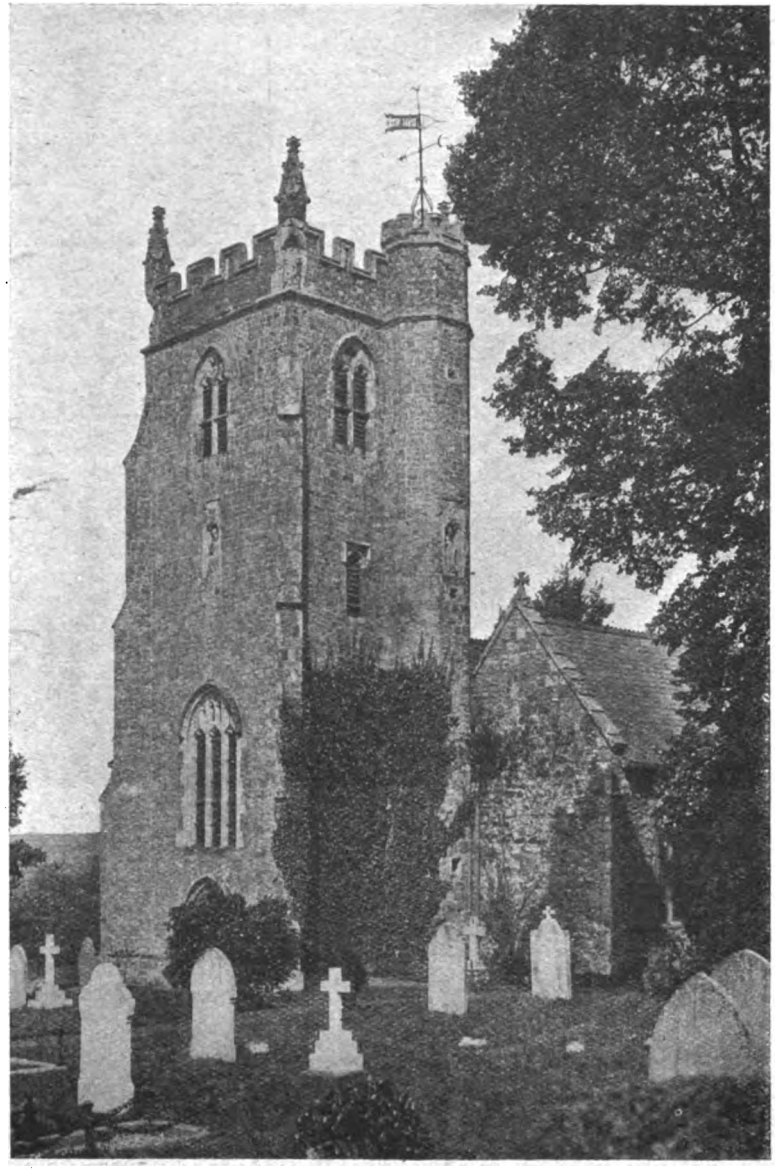
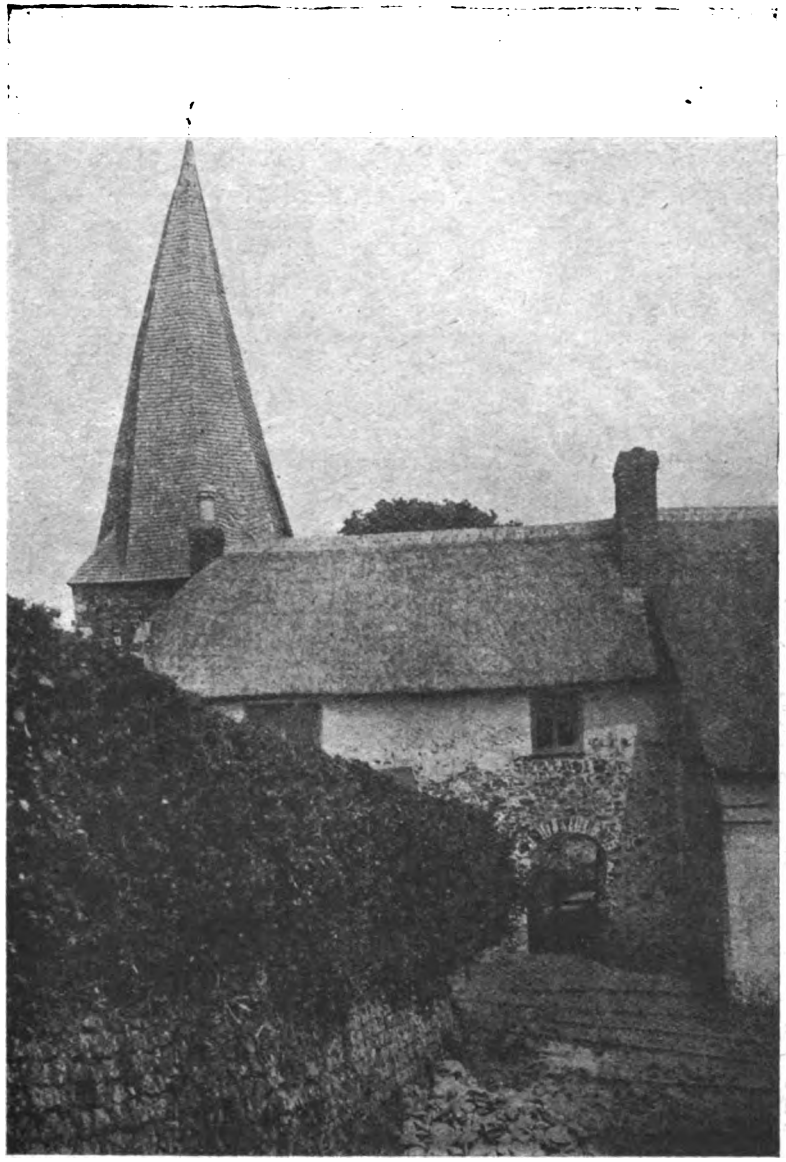


UPTON PYNE CHURCH: WESTERN TOWER.



WEST WORLINGTON CHURCH: SPIRE AND SOUTH APPROACH.

"SOME OLD DEVON CHURCHES."—Photographed by Mr. JOHN STABB.

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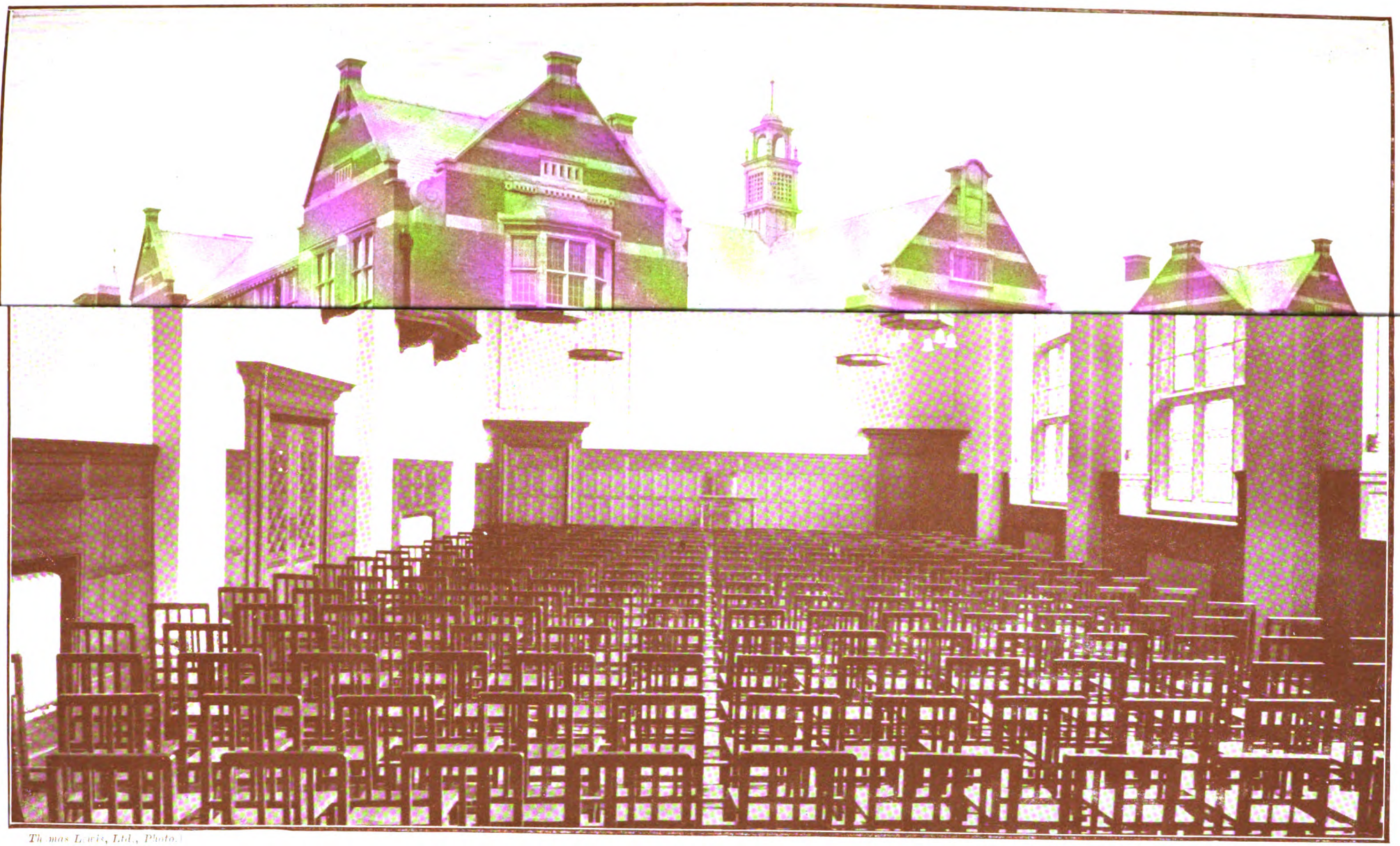

Thomas Lewis, Ltd., Photo.

STOCKPORT GRAMMAR SCHOOL: ENTRANCE FRONT AND INTERIOR OF GREAT HALL.

Messrs REGINALD H. SPALDING and ERNEST G. THEAKSTON, FF.R.I.B.A. Architects.

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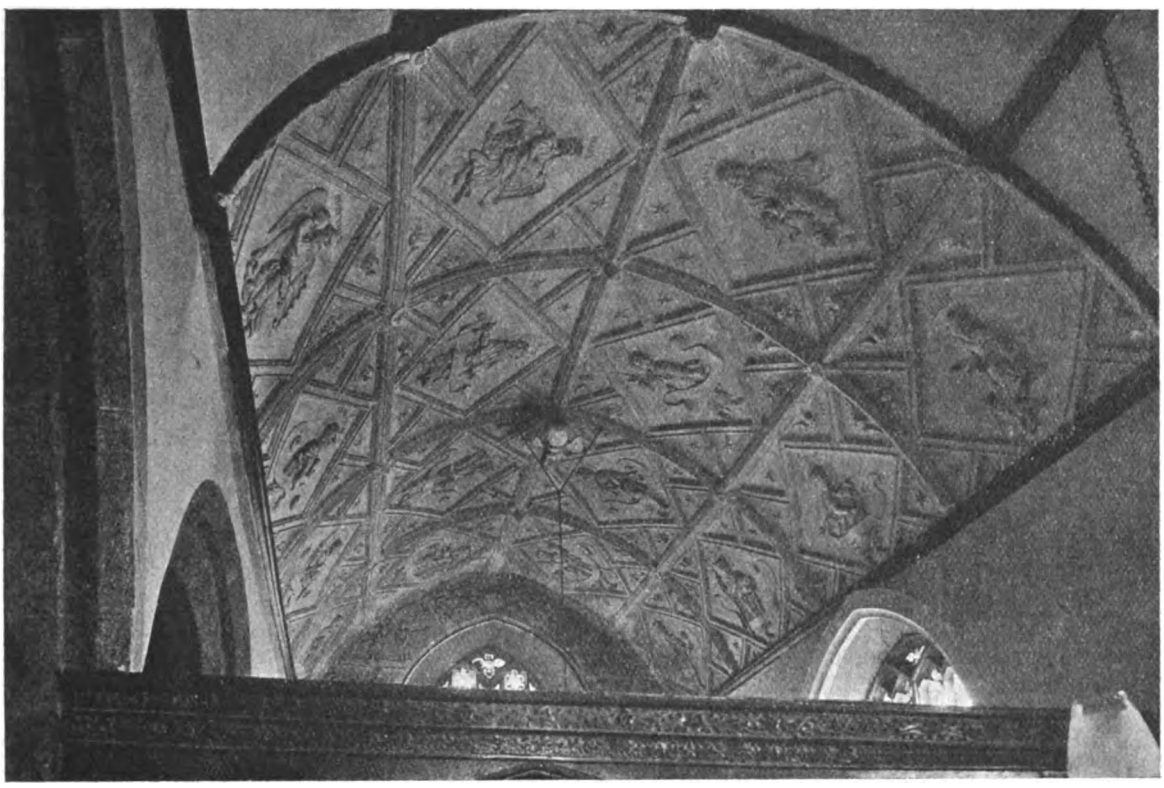
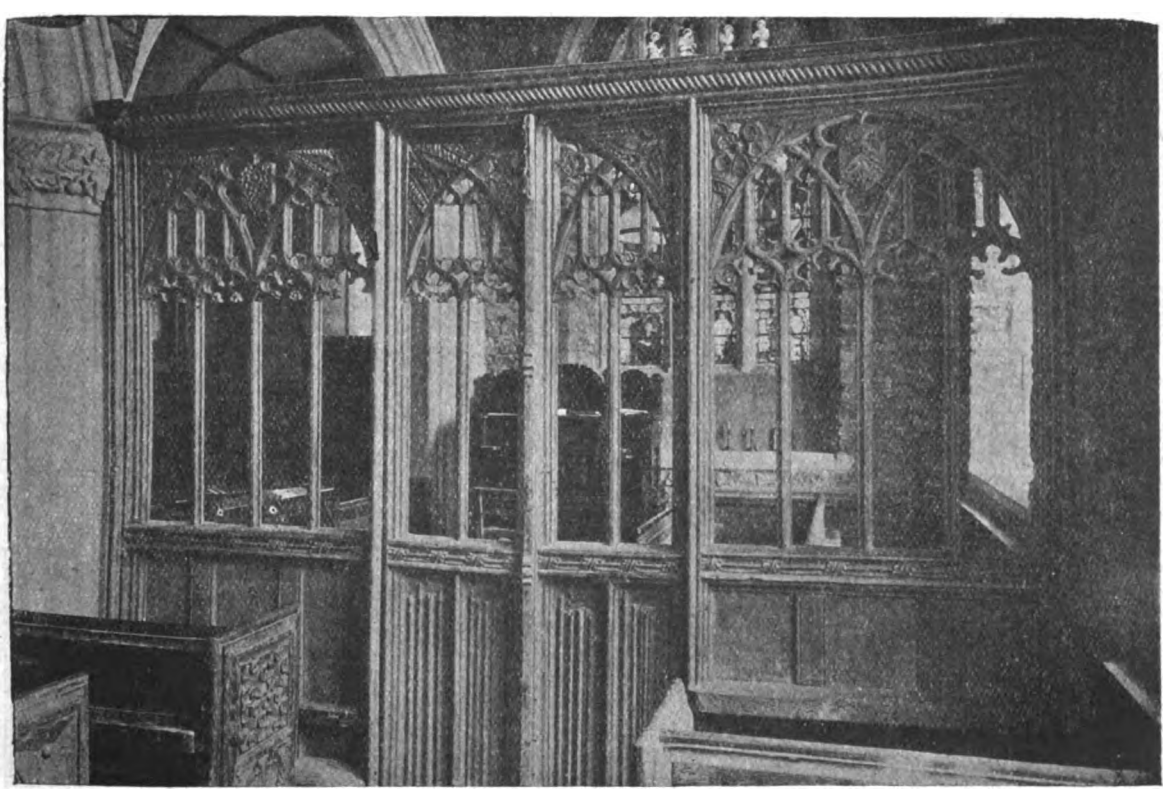


PLASTERED CEILING, SOUTH AISLE, EXMINSTER CHURCH.



SCREEN IN SOUTH AISLE, WEST WORLINGTON CHURCH.

"SOME OLD DEVON CHURCHES."—Photographed by Mr. JOHN STABB.

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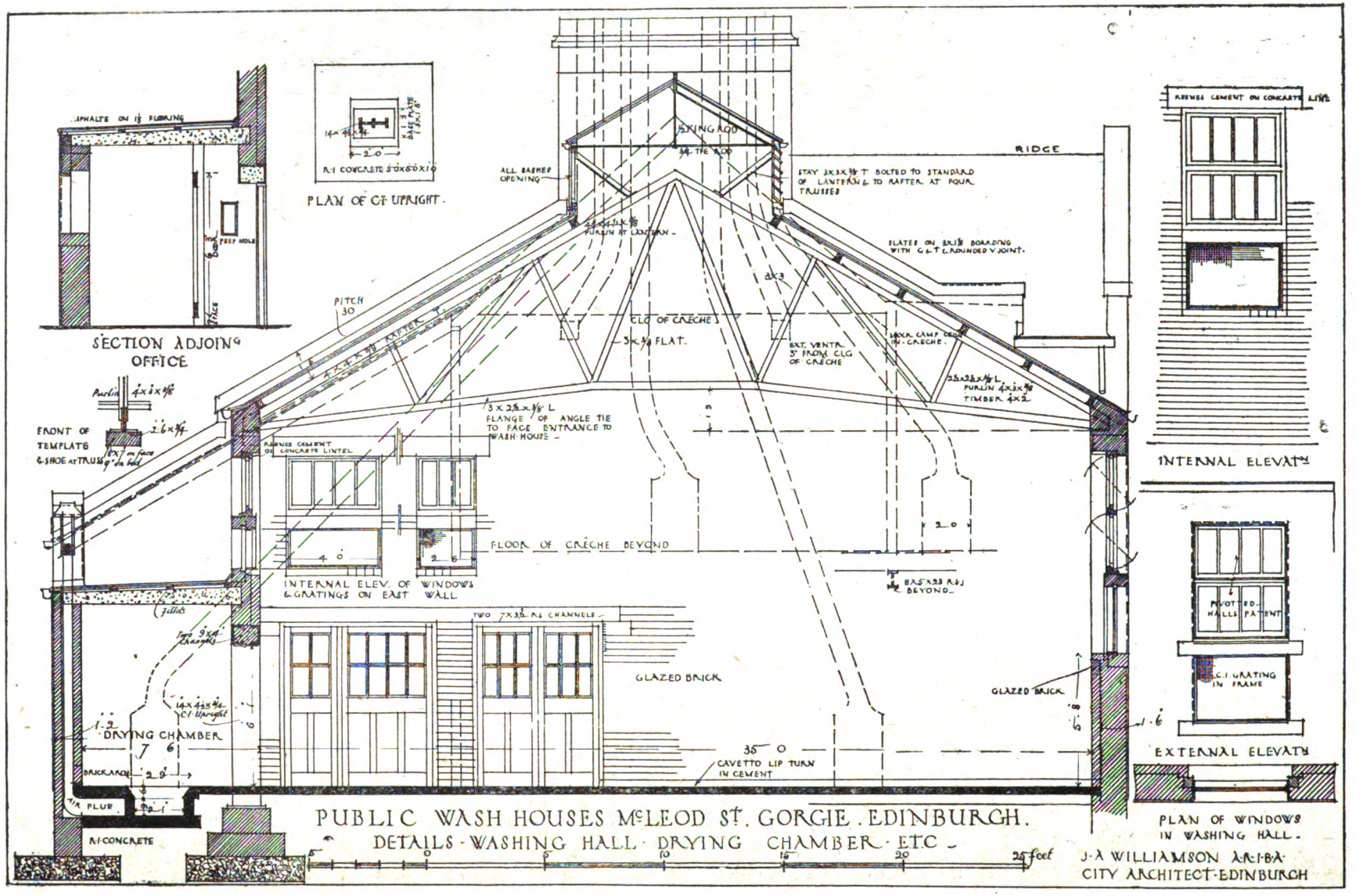

PUBLIC WASHHOUSES, McLEOD STREET, GORGIE, EDINBURGH : DETAIL OF WASHING HALL.
Mr. J. A. WILLIAMSON, A.R.I.B.A., City Architect, Edinburgh.

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Our Illustrations.

THE NEW GRAMMAR SCHOOL, STOCKPORT.

The ancient character of the school—its antiquity is only exceeded by two foundations in the kingdom: Winchester founded in 1387 and Eton in 1441—is thoroughly typified in the new buildings, which are of the collegiate type, the architecture being of the Tudor period. No better site could have been chosen in the borough. From the north and east it is sheltered by the Buxton Road, and from the south the breezes come from the Derbyshire and Cheshire Highlands. In the front of the school is a broad playing-field. In addition, there are four fives courts. The school is approached from the Buxton Road by a private road, along which is an avenue of trees. The main entrance to the building has over it four sculptured panels representing the history of the school from the date of its foundation in 1487. The first panel represents Sir Edmund Shaa, with the figures of a priest on one side and scholars on the other, and it bears the following inscription: "Sir Edmund Shaa, Knight, Lord Mayor of London, a native of Stockport. He of his bounty provided this school A.D. 1487." The second panel represents Alexander Lowe in the act of making his will and bequeathing his house for the purposes of the school. The inscription reads: "Alexander Lowe, mercer, Stockport, bequeathed his house and certain monies to this foundation, A.D. 1587." The third panel represents John Brogden laying the foundation stone of the school in Wellington Road South, and the inscription under the figures reads: "John Brogden, Esq., prime warden, laid foundation stone of the school in Wellington Road South, September 8, 1830"; and the fourth panel shows Ephraim Hallam distributing the prizes to the scholars, the inscription being: "Ephraim Hallam, Mayor of Stockport, 1860. By his bequest the Governors were enabled to erect this school 1915." These panels were designed by Mr. S. Nicholson Babb, R.B.S., of Baron's Court. In the matter of equipment the school is second to none of its class in the kingdom. The class-rooms and administrative rooms are arranged round a central quadrangle, one side of which is formed by a spacious assembly room, named after Ephraim Hallam, Mayor of Stockport. Accommodation is provided for 250 scholars, and includes every requirement for a modern grammar school. On the ground floor there are five class-rooms, each accommodating twenty-four students, and on the first floor five class-rooms, accommodating the same number. There are also two division rooms, each accommodating fifteen students, and these rooms will be used for special classes or advanced study. The science and art departments are arranged on the first floor, entirely separated from the other rooms. The science department comprises two laboratories, preparation and balance rooms for advanced science, and a lecture-room. There is also a well-equipped department for manual training. A large studio, lighted from the north, is provided for art students. On the ground floor provision is made for a large dining-room for the use of dinner boys, with service kitchens adjoining. The headmaster's room is placed near to the platform of the great hall and the governors' room. The library is in a quiet position, and common rooms for the use of the masters and dinner boys are provided. Thirteen years ago there were only 90 boys in the school. Now there are 216. The contractors are Messrs. D. Eadie and Co., Ltd., of Stockport, and the architects Messrs. R. H. Spalding and E. G. Theakston, FF.R.I.B.A., of New Court, Lincoln's Inn Fields. We give the plans to-day, besides the entrance front and interior of hall. Further views will be given at an early date, with some of the working details.

SOME MORE OLD DEVON CHURCHES.

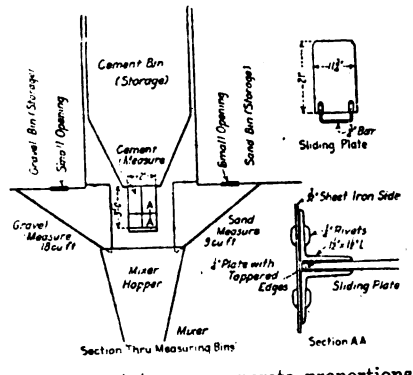
A description of these churches is embodied in our notice of Mr. John Stabb's book on another page.

PUBLIC WASH-HOUSES, McLEOD STREET, GORGIE, EDINBURGH.

Last week we published the plans and general contract drawings of these useful public wash-houses erected by the borough authorities for the city of Edinburgh. To-day we give a detail of the washing-hall and drying-chamber, with figured dimensions and many particulars as to its materials and construction printed on the sheet. There is nothing to add to our previous description given when the other plates appeared. Mr. I. A. Williamson, A.R.I.B.A., city architect, designed and superintended the execution of the premises.

MEASURING DEVICE FOR VARYING CONCRETE PROPORTIONS.

On some concrete jobs several different mixes are often used, and in many cases it is frequently necessary to change from one to the other. The following article by a writer in *Engineering and Contracting* describes a satisfactory and economical method used in the erection of a concrete building where the nature of the work was such that it was necessary to change from one mix to another several times during the day's work. The mixtures were 1:1:2, 1:1½:3, and 1:2:4, consisting of Portland cement, sand, and gravel respectively. Sand and gravel were loaded in storage bins either side of the mixed hopper, as shown in the sketch, a mixer having a rated capacity of 32 cubic feet of loose material being used; the hopper, being stationary, was located a few feet below the bottoms of and between the two storage bins. Directly over



Arrangement to vary concrete proportions at will.

the hopper and between the two bins for rock and gravel the cement bin was placed, with the measuring device attached to the bottom in such a way that the cement after being measured was released as wanted directly into the charging hopper of the mixer. The sand bin was provided with a measuring hopper holding 9 cubic feet of loose material and the gravel bin with one holding 18 cubic feet, each located so that after the material was measured it could be released by a lever operating a sliding door and would flow into the mixer hopper. The cement measuring device was arranged so that by a simple manipulation of blades 4½ cubic feet, 6 cubic feet, or 9 cubic feet, as desired, of cement could be measured, the sand and rock bins being always held the same. Thus for a 1:1:2 mix the material measurements would be 9-9-18; for a 1:1½:3 mix the material measurements would be 6-9-18, and for a 1:2:4 mix the material measurements would be 4½-9-18. It will be noticed that the quantity of loose material in the 1:2:4 mix is about up to the capacity of the mixer, and that the richer materials exceed the rated capacity. The specifications required that the sand and cement enter the mixer in advance of the stone, and due to the fact that the sand and cement were partially mixed before the gravel was admitted and that the gravel being admitted thus into a partially mixed material by the time the gravel was all in enough mixing had been done, so that considerably more material could be added without overtaxing the capacity of the mixer. This proved out on the richer mixtures. Varying the measurement of cement was accomplished by having a box 24 × 18 × 36 inches high, as shown in the sketch, made of sheet-iron 3/32-inch thick, with a partition vertically in the centre, making two vertical compartments, each 12 × 18 × 36 inches. Slots were provided in each of these compartments for three sliding plates 11¾ by 21 inches, as shown in the sketch, one being at the top, one at the bottom, and 1-1ft. up from the bottom. By using one whole compartment thus made 4½ cubic feet of material was obtained; by using the upper 2 feet of both compartments 6 cubic feet was obtained, and by using all of both compartments 9 cubic feet was obtained.

Some trouble was anticipated with the cement arching over the small opening, but by tapping on the sides with a hammer as the cement was being admitted this was avoided. In filling the measuring compartments, however, the air forced out as the cement entered carried considerable cement with it and made the plant operation unusually dusty. With this exception and some trouble in operating the sliding plates at first, due to their sticking in the grooves, the scheme was a success. Free movement of the plates was obtained by grinding the edges to a bevel on both sides, as shown in the sketch, section A-A.—*Contract Record.*

GOVERNMENT BUILDING IN NEW SOUTH WALES.

The Australian Federal and State Government Reports of the various Technical Administrative Departments are models which, we fear, are never likely to be emulated here. The London County Council is the only similar body that at all adequately publishes such summaries. Parliament is lavish enough on the printing blue books by the ton of no interest to anybody but individual members in quest of self-advertisement, and when one happens to be worth preservation no effort is made to enlist the aid of journals representative of our own and similar great branches of art and industry to familiarise those interested with their contents. From Australia we regularly receive reports of the kind covering all the Departments. Nor is this all that is to be said in their praise. An admirable practice prevails in many cases of encouraging the members of the various staffs to contribute original papers on subjects within their purview relative to progress made in other countries, which are lavishly illustrated, and must be of the greatest service to all concerned. There are two such in the report before us, one by Mr. O. Le M. Knight, B.E., giving some notes on recent American cement plant, and another by Mr. C. D. Wallace, B.E., on "Principles and Practice of Sewage Disposal," and we can honestly congratulate both authors on the amount of information they have gathered together, and the lucidity with which it is arranged.

The General Summary of the Director-General of Public Works, Mr. I. Davitt, covers an expenditure of £3,161,931 8s. 7d. during the year ending June 30, 1915, which is £710,462 12s. 9d. less than that of the preceding twelve months. In common with all public and private establishments in the Commonwealth, some of the ill effects of the great struggle in which the Empire is engaged have been experienced. Many of the officers have loyally responded to the country's call; about 10 per cent. of the staff of the establishment has enlisted, and the proportion is steadily growing. The officers who for various reasons remain have cheerfully and voluntarily undertaken the longer hours which it is now necessary for the reduced staff to work to prevent the business of the Department falling into arrear.

THE ARCHITECT'S REPORT.

The report of Mr. George McRae, the Government Architect, is a specially interesting one. Expenditure for the year on public buildings amounted to £433,738 19s. 5d., including £10,320 5s. 4d. for the Commonwealth Government, £74,569 1s. 9d. for other State Departments and undertakings, and £13,804 4s. 9d. for the maintenance and repair of existing buildings.

The most important buildings and works completed during the year or nearing completion at its close are:—Department of Public Instruction Offices, which we hope shortly to illustrate; Bantry Bay Magazines; Little Bay Coast Hospital Pavilions; Newcastle Hospital (first portion); Macleay District (Kempsey)

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Hospital, additions; Coledale Hospital; Prince Alfred Hospital Nurses' Home; Surf Bathing Sheds at Coogee North and South Steyne, Manly, and beaches Freshwater to Newport; University Medical School fittings; Veterinary Hospital foundations; North Sydney Boys' High School; Drummoyne Public School, additions and remodelling; Suspension Bridge Public School; Redfern Public School, remodelling and erection of new girls' department; Hornsby Public School, additional building; Concord West Public School; Hamilton Public School; Cessnock Court House; and additions to numerous court houses, police-stations, and post-offices throughout the State.

Among the works well advanced during the year were the following:—Abattoirs, comprising additional buildings, adaptation of buildings for chilling chambers, installation of equipment for dealing with meat and by-products; University—Fisher Library extension; School of Agriculture, erection; Department of Organic Chemistry, erection; School of Botany, adaptation of portion of Macleay Museum for School of Botany; the erection of three pavilions and the formation of roads in connection with the scheme for the erection of a general hospital at Little Bay to accommodate 1,000 patients.

A notable addition to the scholastic advantages of North Sydney was made during the year in the completion of a group of buildings for High School purposes, at a cost of £8,400. The main building, two storeys in height, comprises eight commodious classrooms (wherein the questions of adequate light and ventilation were closely studied), library, locker room, lavatory (with shower baths), teachers' rooms, and hat and coat accommodation. The detached single-storey science and manual training building comprises rooms of good proportions, well lighted and equipped for the purposes required, and also instructors' rooms and store-room.

REINFORCED CONCRETE SHIP CONSTRUCTION.

By CARL WEBER.*

There is, without question, a great future for reinforced concrete in ship construction. The first attempts have necessarily been crude, and have, therefore, not always been entirely successful. However, we must not forget that all great inventions, especially in ship construction, have been the results of scientific development of ideas which often were introduced by laymen in a very crude form, and were later, with the assistance of experimental marine engineers transformed into the great successes of the present day. Compare the steamship of to-day with the first vessels of this kind. Consider the difficulties which had to be overcome in introducing iron and steel in ship construction, and you will probably agree that the concrete ship of the future will undergo the same development, and, of course, will also be a great success after the combined experiences of the marine and the concrete engineer have come to its assistance.

I have made the building of concrete ships one of my life's problems, and have carefully studied the scientific principles which must be adopted in order to insure success. Not only for the construction of smaller vessels, as barges and scows, is concrete an entirely suitable material, but also for large ocean-going ships will its use be perfectly safe and extremely advantageous.

The principal faults of all previous attempts at concrete-ship construction have been that concrete builders tried to use every-day methods and means in design and mixing and applying the materials. Most of these vessels were built of ordinary concrete mixed and placed in the common way. The special requirements of ultimate service were not sufficiently taken into consideration. The designs were made without consultation with marine engineers, and the strains which the empty and the loaded ship had to resist under all the different and changing conditions were only more or less intelligently guessed at.

In spite of all this, however, satisfactory results have been obtained in most cases, and, therefore, the subject is worthy of careful consideration and encouragement, especially at this time when the production of freight ships is one of the greatest problems of all nations.

TWO METHODS OF CONSTRUCTION.

So far two methods have been used for the construction of concrete barges:—

The first method consisted in building an inside and outside form for the ship's hull, and between these forms (which were separated to allow for intended wall thickness) the necessary reinforcement was placed. Then a concrete, composed of Portland cement, sand, and crushed stone or gravel, was poured in a semi-liquid condition to fill the forms and to encase the steel reinforcement. After the concrete had sufficiently hardened, the forms were removed, and the barge was finished by pouring bulkheads, division walls, decks, etc., in a similar manner.

This method resulted in extremely clumsy and heavy vessels, which can only be used for sand and construction barges. The ship itself is unelastic, and in collision with wharfs and other vessels dangerous cracks develop which are difficult to repair and which will often result in loss of the entire ship.

The second method consists in using a light steel skeleton, placing over the outside of it an expanded metal or wire fabric, and finishing the hull by plastering over this sheathing a rich mortar coating in the same manner as light curtain and partition walls are formed in fireproof-building construction. This method is a great improvement over the first one, but can only be used for smaller boats, launches, etc., and, of course, is practically out of the question for freight barges.

NEW METHODS SOLVE THE PROBLEM.

I have invented and developed a series of entirely new methods of construction, which not only solve the problem in a scientifically correct manner, but allow the building of large and small concrete vessels of remarkable elasticity and of comparatively light weight. In addition to this, the cost of construction is greatly reduced, because no forms are required. All concrete is handled, applied, and finished by machinery especially designed for the purpose. The risk of poor workmanship is almost completely eliminated.

Owing to the present international patent situation, I am not able to publish complete details of construction. In order, however, to give some advance information to your readers who are interested in the subject, I will here explain the general outlines of the methods employed in my systems:—

A STEEL FRAMEWORK.

The ship's hull consists of a strong framework of steel, which is so designed that the combined strength and advantages of steel and concrete are fully recognised. This truss frame is erected and riveted in the ordinary manner. In the completed ship the steel frame is entirely encased in concrete, and thereby protected against rusting. By this encasing the steel members are also stiffened and the buckling stresses are greatly reduced. For this reason the steel members of the frame are of simple design and relatively light weight.

After the steel frame is completed it is covered with my multi-unit wall construction of varying thickness. The walls are formed of a high-grade concrete applied by compressed air, and each section is independently reinforced by networks of light steel bars and wire mesh. All ship walls, bulkheads, decks, and partitions are formed in a similar manner without the presence of any construction or connection joints, so that the completed ship is one seamless, monolithic structure.

The concrete is composed of Portland cement and crushed quartz or other suitable stone material. All pieces not passing a ½-in. screen are rejected. These materials, with the necessary waterproofing medium and the water for proper hydration, are mixed and ground together, and before being placed are properly conditioned to reduce the danger of cracking because of excessive expansion and contraction.

SPECIAL MACHINE APPLIES THE CONCRETE.

The material so prepared is applied in even and uniform layers by means of a powerful stream of compressed air with a special machine named the "Tector," especially designed by me for this purpose. For the material combination thus described the name "Torcrete" has been adopted. It is really a waterproof concrete of highest possible quality.

After the last coat of Torcrete has sufficiently hardened, the outer surfaces are rubbed down to an even, smooth finish with rotary compressed-air-driven grinders, and the entire ship may be painted as usual.

These, of course, are only the general outlines of future cement, or rather Torcrete, ship construction. These methods can also be advantageously employed for reconstruction and repair of old steel ships and for placing of bulkheads, tanks, and decks in old hulls.

The principal advantage of the Torcrete ship are its low cost and the rapidity with which such vessels can be built. However, even at a considerably higher price, its use would be of greatest value for cargoes which require even temperatures and which are destructive to steel. For tank barges, ore and coal boats, refrigerator ships and similar vessels, the advantages of a non-rusting ship will be quickly recognised. Improvements will be made as quickly as the development suggests, and, of course, the combined experiences and efforts of marine, concrete, and structural engineers must be utilised to the fullest extent.

* President Cement-Gun Construction Co., Chicago.

LEGAL INTELLIGENCE.

A BRISTOL CONTRACTOR'S CLAIM.—In the King's Bench Division last week, Mr. Justice Bray heard a special case set down by the arbitrator in connection with a dispute between Mr. Louis G. Nott, contractor, Bristol, and the Corporation of Cardiff as to certain items in connection with the contract for the construction of a reservoir for the corporation. The contract involved a sum of about a quarter of a million, and there were twenty-one points in dispute between the parties, and nine of these were decided by the arbitrator in favour of Mr. Nott, who was awarded £12,360 and the costs of the arbitration. The Cardiff Corporation disagreed with the arbitrator's findings, and asked him to state the special case. Mr. Walters, K.C., on behalf of Mr. Nott, argued in support of the arbitrator's findings. Mr. Holman Gregory, K.C., appeared for the Cardiff Corporation. His Lordship said he would send the case back to the arbitrator for further information on certain points. Addressing counsel, his Lordship remarked: There is one more appeal I should like to make. You see the arbitrator has found that the contractor has been badly treated. He has, undoubtedly. You cannot get away from that. Ought not the corporation, apart from their own legal position, to do something? It may save great expense in the end in going to the House of Lords. I quite see the difficulty of the question. Mr. Gregory said he would convey his Lordship's suggestion to the corporation, and Mr. Walters remarked that he would consult with his client to see what could be done.

MANCHESTER ROYAL EXCHANGE: PLUMBING CONTRACT.—At the Manchester Assizes, last Thursday, Mr. Justice Shearman, in the Crown Court, gave judgment in an action tried before him in which the plaintiffs, Messrs. Jaffrey and Co., plumbing contractors, Manchester, sought to obtain damages from Messrs. S. and G. A. Allwood, ironfounders, Derby, for breach of contract to supply certain gutter piping for the extension of the Manchester Royal Exchange.—The plaintiffs, according to the case they presented, had undertaken a contract, for the sum of £12,000, to do the plumbing at the Exchange extension, and had entered into a contract with the defendants to supply materials. The building operations were subject to delay, and the defendants thereupon declined to deliver the undelivered portion of the piping except at a higher price. It was stated in the course of the trial that the contract for the alteration and extension of the Royal Exchange covered about £250,000. The defence was that there had been a breach by the plaintiffs, which entitled the defendants to rescind the contract.—The Judge held that the plaintiffs were entitled to judgment. Both the parties to the action had, he was sure, acted honestly and properly in the matter, and he had to decide which had suffered loss of profit caused by a delay for which neither was responsible. He had arrived at the conclusion that there had been no unreasonable delay on the part of the plaintiffs,

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and that the defendants were not justified in cancelling the contract. Judgment would be given for the plaintiffs for £255—the amount agreed upon—with costs.

IN RE PETHICK, DIX, AND CO.—Mr. Justice Horridge, sitting in the High Court of Justice as bankruptcy judge on February 18, heard an application by Sir Chas. Cameron, Bart., arising out of the failure of Messrs. Pethick, Dix, and Co., contractors for the construction of the Derwent Valley light railway and other public works. Mr. Hugo Young, on behalf of the applicant, asked the Court to order Mr. R. J. Ward, trustee in the bankruptcy of Pethick, Dix, and Co., to admit Sir Chas. Cameron's proof of debt for £4,541, and, in the event of the Court rejecting the claim of the National Provincial Bank of England, to admit a further proof for £4,340 to applicant as entitled to rank against the assets of the firm, as represented by the sum of £10,000. Counsel pointed out that the firm of Pethick, Dix, and Co. was originally composed of Mr. Henry St. John Dix and Mr. A. H. Pethick. That firm undertook, among other public works, to construct the Derwent Valley light railway. The firm was dissolved in April, 1911, but the dissolution was not gazetted, and so far as the public generally knew the firm continued. In July, 1912, Mr. Dix, the continuing partner, took a limited partner, in the shape of Mr. E. W. Knowles, which fact was also unknown to the public. The Derwent Valley light railway contract was expressly excluded from the limited partnership, but no proper steps were taken to ensure the limit being effective. In May, 1914, Mr. Justice Sankey held that Mr. Knowles was a general partner, and that the limitation was not effective. Subsequently on the bankruptcy of Pethick, Dix and Co., an application was made to adjudicate Mr. Knowles a bankrupt as a partner in the firm. That application was withdrawn, in consideration of Mr. Knowles offering to provide a sum of £10,000, which was treated as his full estate available for the partnership. That money was, it was believed, the only substantial asset of the estate of Pethick, Dix, and Co. Counsel having dealt at length with various agreements, submitted that the claim of Sir Chas. Cameron was in respect of matters entirely outside the Derwent Valley light railway contract, and that it should therefore be allowed to rank against the estate for dividend. The further hearing was adjourned.

OBITUARY.

Lieutenant Noel H. Statham, East Surrey Regiment, who was killed on February 3, aged 24, was the third son of Mr. H. Heathcote Statham, F.R.I.B.A., one of the former editors of the *Builder*. After leaving King's College School, Wimbledon, where he held a scholarship, he gained the Rothschild scholarship for French, and entered the University at Antwerp. In 1912 he took a history scholarship at Trinity Hall, Cambridge. For two years before the outbreak of war he held a commission in the East Surrey Regiment.

Mr. John Carmichael, J.P., late of the Alloa Brick Works, died last Wednesday at his residence, Smithfield, Alloa. He was educated for the ministry, but on the death of his father he gave up his theological studies and joined his brother, the late Mr. W. R. Carmichael, in carrying on the business of brick and tile manufacturers. He took a deep interest in social and religious work, and about four years ago celebrated his jubilee as an elder in Moncrieff United Free Church. His only son, who joined one of the Australian contingents at the outbreak of war, was killed in action last year.

STATUES AND MEMORIALS.

THE HENRY JAMES MEMORIAL.—Mr. Derwent Wood's bronze bust of Mr. Henry James, the cost of which is being defrayed by subscriptions, will be presented to the Chelsea Public Library to-day—the first anniversary of Mr. James's death—at five o'clock. The marble shaft will bear the following inscription: "Henry James, O.M. Novelist and Critic. Born in New York, April 15, 1843. A lover of both France and England, he became a British citizen in the first year of the great war. Died at Cheyne Walk, Chelsea, February 28, 1916. This bust, modelled from the life in 1914, by Francis Derwent Wood, A.R.A., of Chelsea, was presented to the Public Library, Chelsea, by 150 Chelsea Folk in 1917."

Correspondence.

THE ARCHITECTURAL ASSOCIATION RED CROSS DETACHMENT

(London 43rd).

To the Editor of THE BUILDING NEWS.

Sir,—With talk of National Service in the air, most of your readers are doubtless asking themselves how they can best use their energies to the national good. May I bring the claims of the Architectural Association Red Cross Detachment before these, as we are badly needing more members?

The value of the work which the detachment is doing cannot be over-estimated. Those members we have are working very hard, but it will not be possible for them to cope with all the duties which the detachment is called upon to perform unless their numbers are increased. We appeal particularly to members of the architectural profession to join us, and I am certain the only regret of those who respond will be that they did not come forward earlier and help in what is surely one of the finest branches of voluntary work that can be undertaken at the present time.

If there are any whose sympathies are with us, but who are prevented from becoming members by age or distance from town, they can give practical evidence of their sympathy by sending donations, either for the general funds of the detachment, which always need augmenting, or by subscribing towards the ambulance which we are hoping to buy from funds raised by our members for use in connection with the detachment work.

Communications should be sent to me at the address given below.—Yours faithfully,

F. R. YERBURY,
Quartermaster.

Architectural Association Red Cross Detachment (London 43rd),
37, Great Smith Street,
Westminster, S.W.

February 22, 1917.

PROPOSED NATIONAL WAR MEMORIAL.

Sir,—I have read, with interest, Mr. Middleton's letter in your last week's issue. I expect criticism, and welcome it.

I well remember meeting Mr. Middleton, in the Chapter House, on the occasion he refers to, when he was at the head of a large party of Colonial "Tommies," showing them the beauties of the Abbey, with all that youthful virility, and enthusiasm, which reminded me of his guidance in Normandy and Flanders (many years ago), when I was one of the visitors accompanying the Society of Architects in their delightful trips abroad. The only complaint I have to make, is, that it was not with his, but with my, 2-ft. rule, he took for me the dimensions he refers to.

With regard to interference with the surroundings of the "Little Cloisters," as the article in THE BUILDING NEWS, of February 14 points out, "modifications of the plan may be found necessary when a detailed survey is made," and, to that, I may add, I hope to be furnished with such a survey, later on.

But, if Mr. Middleton will look at my plan, published in THE BUILDING NEWS, he will see that the "Little Cloisters" with their "Walks" are left intact, and it is of importance that I should see, exactly, what there is, of archæological interest, between the North and East Walks of those Cloisters, and the Chapter House. No sane architect would suggest the "destruction of the 'Little Cloisters,'" and I, certainly, do not indicate that on my plan, and I think that much of what Mr. Middleton states I should destroy, are mere remains.

As to the "dimensions" of the proposed Memorial Chapel, I may remind Mr. Middleton that, as figured on the plan published in THE BUILDING NEWS, the length of the proposed chapel is 155 ft., and the width 65 ft. The height to the vaulting would be 75 ft. This is about the total width of Henry VII. Chapel, and within 10 ft. of the total width of the Abbey—including the aisles. The height to the vaulting of the Abbey is about 114 ft., so that the "dimensions" of the proposed Memorial Chapel are not so small as Mr. Middleton assumes. But, that is all subject to modification, as I have suggested; for the present, I am only dealing with the general idea.

With regard to the "position" of any War Memorial Chapel or Valhalla, Mr. Middleton's suggestion of Charing Cross or Kingsway, seems to me to be quite outside the line. The Royal Commission, which sat in 1890, were unanimous that a Memorial Chapel should be erected "as an adjunct to the Abbey," and probably the greater majority of Britons would agree. The Abbey is the very "Mecca" of us all. We must continue to wander through its glorious memories, and we must pass from them into the "adjunct," which will not only keep alive the memories of to-day, but will, in their turn, command the adoration of posterity.—I have the honour to be, sir, your most obedient servant,

WM. WOODWARD.

13, Southampton Street, Strand.
February 23, 1917.

THE REGISTRATION OF BUSINESS NAMES ACT.

SIR,—May I seek the hospitality of your columns for the purpose of calling attention to the obligation imposed by the Registration of Business Names Act on shopkeepers and other tradesmen, and, in fact, on everyone carrying on a business or profession in this country (except limited liability companies and other corporations)?

This Act provides that on and after March 21 next all persons carrying on business in this country must trade under their own true names or else must be registered.

The object of the Act is to enable everyone to know with whom they are trading; and if persons are trading under their own names, with no additions except their Christian name or names (or the initials thereof), it is not necessary to register; but if anything is added to the true name, or if a business is carried on under a fancy title, registration must be effected between February 21 and March 21, on pain of heavy penalties.

A simple instance will serve to show what is required: If, for instance, John Smith owns a business, he may trade as "John Smith" or "J. Smith," and need not register; but if he trades as "Smith and Co." or adopts a fancy title, such as "The General Drapery Stores," registration must be effected. And in addition to registration, all business letters, trade catalogues, trade circulars, and showcards which are issued or sent to any person in any part of his Majesty's Dominions must show in legible characters the true name or names of the proprietors of the business and the present nationality or the nationality of origin if other than British.

The individuals and business firms who are not trading under their own name or names (with no additions thereto) are liable, if not registered by March 21 next, to a penalty up to £5 per day for every day of the offence; or if such individual or firm enters into a contract while not registered, such contract cannot be enforced by the law if the other party should want to get out of it. It is also open to any private individual to set the law in motion against a defaulter, except in regard to Section 18 (publication in trade catalogues, etc.), where the consent of the Board of Trade must be obtained. It is understood that the forms for registration will be obtainable on and after February 21 from the principal Post Offices, and the offices of the Registrar for England and Wales are at 39, Russell Square, W.C.—I am, Sir, yours faithfully,

JAMES MARTIN,
Chairman of the Parliamentary and Commercial Law Committee, London Chamber of Commerce.

1, 2, and 3, Oxford Court,
Cannon Street, E.C.

SHOULD RENTS BE DOUBLED?

Sir,—If everyone agreed to double the rents of their property the tenants would have to pay. Some would remove into smaller premises, but there are not sufficient small ones to go round.

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After the war mortgage interest and rents will increase. But is it fair to commence to raise the rents of the smallest tenancies first, or should an attempt be made now with the better-class tenants who are investing in the war loan, while the landlord has his money locked up in property?

An example will best illustrate my meaning. In pre-war times, when the normal interest was 3 per cent., investors would build or buy property to show 5 per cent., which would leave them 4 per cent. net, 1 per cent. above the normal, and 1 per cent. for leakages and outgoings, and a freehold rent of £30 should secure a purchaser for £600. Now, and for very many years after peace, the cost of building will be one-third more; the same building will cost £800. But now, and for another generation, the normal interest is 5 per cent., so that anyone buying or building on the same principle as before should ask 7 per cent. for his money. The current interest or rent, therefore, on the present and future cost of the house would be £56 and a little extra for repairs. Landlords have everything to gain by a gigantic national combination to double rents. If the tenants remain the landlords double their incomes, and at the same time halve the rates. If some tenants remove, practical necessity will compel half to remain, and the landlord's income will be the same until the whole are gradually let; also tenants will be encouraged to buy their own houses by the aid of their building society, or they may buy vacant land and employ the builder and architect.

When it is realised that the rents of larger properties have been doubled, the cottager will not consider himself ill-used if his rent is doubled after the war in consequence of the action of the mortgagee, and it is fallacious reasoning to irritate tenants by continually raising the rents 25 per cent. at a time.

Yours obediently,
W. H. WOOD.

Queen Square House Leeds,
Feb. 23, 1917.

PROFESSIONAL AND TRADE SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A lecture was delivered by Mr. John Ritchie, M.A., LL.B., Perth, on "Romanesque Churches in Poitou" in the Lecture Hall of the College of Art last Friday night. Mr. John Wilson, F.R.I.B.A., vice-president, presided. The lecturer said the problem which these Romanesque builders had before them was how to vault with stone a building of the type of the early Christian basilica. In the Poitevin school the method adopted was to construct a tunnel vault of stone which rested directly on the pier arches of the nave. There was no triforium; no clerestory lighting. All the light for the interior was derived from the windows of the aisles.

HOUSE PAINTERS.—The quarterly meeting of the Council of the National Association of Master House Painters and Decorators was held last Thursday at the Salford Town Hall. The president of the association is the Mayor of Salford (Councillor James Higson), who has held the office for three consecutive years. The principal business was the ratification of a proposal put forward by the operatives for the establishment of a national joint committee of employers and operatives, with the object of raising the status of the craft. The functions of the committee will be to prevent strikes and lockouts, to deal with questions arising out of the demobilisation of apprentices after the war, to help painters partially disabled in the war, and to settle questions of status, education, and payment of apprentices.

Mr. Wilfrid Ball, R.E., a painter of water-colours and an etcher, of Summerset, Lymington, died from heat stroke at Khartoum on the 14th inst., aged sixty-four years. He had exhibited at the Royal Academy for many years, and was the holder of the bronze medal, Paris Exhibition, 1900, for etching. He also won the London Athletic Club challenge cup for walking in 1876. Mr. Ball gave up his painting and went out to do war work in Egypt.

Building Intelligence.

BIRMINGHAM.—More schools are badly wanted in Birmingham, and the Birmingham Education Committee have come to the conclusion that at least three small schools will have to be erected at the earliest possible date, in addition to the new schools required in consequence of the development of the outlying districts. Inquiries have accordingly been made for suitable sites in the areas where the pressure is greatest, viz.:—(a) Bordesley, Bordesley Green, and Small Heath; (b) Dudley Road, Winson Green; and (c) both sides of the upper part of Broad Street. The sub-committee have received an offer of about 3,000 yards of land in Garrison Lane, which they think will be very suitable for a school to serve the Bordesley district. The price asked is £1,000, plus vendor's costs, and purchase of which is recommended. A site for a school at Winson Green has been found in Peel Street, and the sub-committee advise closing with the offer of freehold and leasehold interests for £850 and £525 respectively. Nothing definite has yet been arranged for the Broad Street neighbourhood, but the sub-committee have a scheme under consideration. The estimated cost of each building is £8,000, and £346 extra for furniture in each case. The sub-committee also report that the preliminary plans for a new school in York Road, Hall Green, have been amended. The total estimated cost is £14,900, plus £1,182 for furniture and fittings. It is not intended to build this school until after the war.

CHATHAM.—At the opening of The Picture House, Chatham, on Monday last, the Mayor said he wished to heartily congratuate Mr. Oswald Stoll, Alderman H. E. Davis, and the other directors in providing such a splendid picture house. He desired to congratulate the architect (Mr. H. Dunstall), who was a Chatham man, on designing the building, and also the firm of Messrs. Skinner and Son, for the manner in which they had executed the work, and Messrs. Nicholson and Lord upon the sweet-toned organ. The new building is 90 ft. by 62 ft., and will seat nine hundred persons. The The pitch pine flooring has a fine rake or rise which will enable every patron to obtain a good view of the screen. The situation of the building not requiring external architectural treatment, the decoration of the interior has been designed on a sumptuous scale. The walls are treated with Ionic pilasters with capitals of chaste design, the whole surmounted by a fine entablature, comprising an enriched cornice, frieze, and architrave. Panelled bays occupy the space between the pilasters, within each of which is an oval panel containing a fine decorative oil painting in the Watteau style. The circular ceiling is treated in harmony with the walls in bays by unusually bold and enriched ceiling ribs. A great feature is made of the screen, which is surrounded by an enriched bronze frame flanked by an organ chamber on either side. The colour treatment is in two tints of cream with the enrichments treated in real gold leaf and bronze. The lighting throughout is by electricity, handsome hanging bowl fittings are suspended from the ceiling, and around the walls are three-light torch-fittings, with red and white globes. The building has been erected from the designs and under the superintendence of Mr. Herbert H. Dunstall, A.R.I.B.A., F.S.I., of Rochester, and 66, Victoria Street, Westminster.

MANCHESTER.—The additions recently made to the Municipal School of Art, Manchester, were formally opened last Wednesday by Sir Thomas Shann, chairman of the Manchester Education Committee. The cost of the extension, including equipment, has been £5,100. The extra accommodation now provided includes better rooms for lectures; for craft work in wood-carving, stone-carving, metal work, and embroidery; adequate rooms for the School of Architecture, and more suitable accommodation for teachers' rooms and for the students' dining-room. Councillor Marr, chairman of the School of Art Committee, who presided, said he thought the school was not so well known nor so much appreciated as it deserved to be. A silver key with which to open the door leading to the new rooms was given to Sir Thomas Shann, made by Mr. Newland Smith, head of the craft and jewellery department, and his students.

ST. HELENS.—The congregation of St. Helens Parish Church have decided to apply for a faculty authorising them to form a chapel for communions, baptisms, and weddings under the north gallery of the church. The choir vestry will be used for the clergy and the chapel will be entered by the tower door. Sanction will also be asked to remove the fittings and interior of the ruined church and to build a wall dividing the north side from the rest of the interior and roofing it over. A suggestion that the whole of the building be roofed over and used pending the erection of a new church was rejected as too costly an idea. The meeting expressed itself strongly in favour of rebuilding the church on or near the present site.

Our Office Table.

Exmoor is one of the most beautiful of the too few wild places of England which circumstances have allowed to remain almost in their original state. Many know that a part of this district has long been the property of the Acland family. The present owner, Sir C. Thomas Dyke Acland, Bart., has for some time been anxious to safeguard this beautiful country, as far as it is his property, from such dangers as might possibly arise in future, from disfigurement or injury through building development or otherwise. With this object he approached the National Trust with a view to seeing whether it could co-operate with him in a scheme which, without depriving his successors of the enjoyment of the property, would ensure the preservation of its natural features in the way he desired. The negotiations have been successful, and that, unless legal difficulties should arise, some seven or eight thousand acres of very beautiful country will be permanently preserved in their natural condition under the guardianship of the National Trust. The Trust will not become the owner of the lands. Sir Thomas Acland will grant to it a lease of them for 500 years. He and his successors will continue to enjoy the rents and profits and all the ordinary rights and powers of an owner, except that the owner will have no power to develop the estate as a building estate.

At the meeting of the Huddersfield Town Council last Wednesday Councillor Robson moved a resolution viewing with great concern the action of various munition firms in buying dwelling-houses and then giving notice to the tenants, and urging upon such concerns the desirability of using the powers they possess in the direction of building the houses which were so urgently needed. Councillor Robson said that householders were calling upon him and stating that seventeen houses in one street and eight in another had been purchased by a munitions firm, evidently for use by their own workpeople. The agent had informed them that they would shortly be receiving formal notice that they must look out for other houses. The case quoted was not an isolated one, and probably it was taking place in other districts of the town. The Housing Committee were doing their best to meet the shortage of houses, but they could not get the consent of the authorities to build, and this action of the firms was accentuating the housing problem, which in all conscience was bad enough. What made the matter worse was that the munitions firms were the only people who had the power to build houses. The resolution was carried unanimously.

In an address at the Royal Institute of Public Health last Wednesday on "Tuberculosis Problems considered in War Time," Dr. Lister referred to the reorganisation of the medical profession for civilian practice. This, he said, was urgently required. The real solution of the urban difficulty would only be found when the general medical practi-

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tioner, with all his colleagues in the district, was on the staff of a centrally-placed and properly-equipped institution. The single surgeries, each with its own hours, were the cause of most of the trouble in securing proper examination and treatment of the real sick. Sir James Crichton Browne said that when the war was over, instead of a Ministry of Munitions we should have a Minister of Health, and under him a co-ordination of all those health agencies and institutions at present existing but overlapping.

Presiding at the Carnarvon Board of Guardians, on Saturday, Mr. J. C. Lloyd Williams proposed a resolution adopted by the Festiniog Urban Council appealing to the Director of National Service to regard the slate trade as essential to the district, as the closure of the quarries would be disastrous to the population, and it would be impossible at the termination of the war to reopen most of them, and pointing out that most of the men now employed were over military age or not eligible for national service. The motion was supported by Mr. R. G. Roberts, a quarryman member, who predicted that should the slate industry be declared non-essential many of the Nantlle quarries would never be reopened. The men now employed there were to the extent of 80 or 90 per cent. outside the national service age. The resolution was carried, and a resolution in similar terms was subsequently adopted at a meeting of the Gwyrfai Rural Council.

A letter from Mr. Walter Butterworth from his internment quarters at Ruhleben, Germany, has been received by the chairman of the Manchester Art Gallery Committee, Mr. F. Todd. Mr. Butterworth says: "You will, perhaps, like to hear a little about art matters in Ruhleben. We really have some activity in arts and crafts. There is no stint of craftsmen, who produce very clever work in wood, metals, etc. With provision tins they make the most astonishing things, including tackle for our physics and chemical departments, for weighing, testing, measuring, etc. With only tins and wire a man made an amazing electrical clock, which has kept faultless time for over a year. Other men made a handloom for demonstration purposes, which wove cloth before our eyes, at a meeting of Yorkshiremen, at which I presided. Turning to the fine arts of painting and sculpture, I did not know we had any sculptors until this month, except one clever young artist who models heads in clay. But this month we have had a great deal of snow, and two men who have hitherto been resting came forward, and, like Michael Angelo on a famous occasion, began to model in snow. But our designers and painters are the most numerous and active (after the musicians). They have a shed, in which art exhibitions are held periodically. Many portraits are drawn and a few painted. One artist is just completing a portrait of me in pastels. There is an endless outpouring of theatre posters, caricatures, humorous drawings, skits on the camp, etc."

The growing scarcity of houses, inconvenient enough in several of our local districts, is becoming something of a menace in Bootle. From the official figures, just published, it would appear that last year only one single dwelling-house was erected in the whole of the borough, while in the adjacent township of Orrell there were fourteen. This lack of building is occasioning more and more overcrowding in the most undesirable quarters, and there is a feeling in the borough that something should be done to relax, in some degree at least, the existing restrictions. Ten years ago the annual return of houses erected was 351.

Cement foundations of buildings are endangered not only by free sulphuric acid, but also by the soluble sulphates of calcium and magnesium. According to W. Thörner, peat soils contain only small and harmless amounts of these sulphates; moorlands near the sea may, however, be richer in them. The reason of the destructive action of the soluble sulphates is, according to H. Kühl—compare *Zeitschrift für Angewandte Chemie*, 1916, pages 335 and 363, for both these papers—that a voluminous compound of the formula $3CaO,Al_2O_3,3CaSO_4$ (Candlot and Michaelis) is formed, when soluble sulphates penetrate into cements, whose sulphate percentage was originally unobjectionable.

A meeting was held last Thursday of the Special Committee appointed by the Birmingham City Council in 1913 to inquire into the housing conditions of the poor in the city. The committee, it may be remembered, presented a long report to the council in October, 1914, embodying certain recommendations, which the council approved. A further report was presented the following October, in which the committee stated that owing to existing conditions they proposed to suspend their sittings, and since then the inquiry has been in abeyance. The committee resumed work last Thursday, however, and after electing the Lord Mayor as their chairman, decided to proceed with the consideration of the further recommendations they have to make to the council. It is not intended to put any proposals into effect until after the conclusion of the war.

The Congress of Archæological Societies has issued its report for 1916 of the Committee on Ancient Earthworks and Fortified Enclosures. Vandalism, due to carelessness or ignorance, is always to be feared, and must constantly be guarded against. By the vigilance of local archæologists the danger to earthworks and other remains in the neighbourhood of Stonehenge, due to military operations, has been averted. A more serious problem arose regarding the protection of Cannington Park Camp, in Somerset, owing to mining operations. "This case," the committee observes, "brings out forcibly a weak point in the Ancient Monuments Consolidation and Amendment Act, viz., that there exists no power to give compensation or to acquire a site where the destruction of an earthwork or other ancient monument would be to the pecuniary advantage of its owner or tenant. It remains to be seen how far the Legislature will be willing in such a case to put in force the compulsory power of preservation that now exists.

Following on the Defence of the Realm Regulation, made on February 16, authorising the Board of Trade to take possession of canals in this country, the Board has made an Order taking possession of a number of canals as from March 1. They have also constituted a Committee to control on their behalf the canals taken over. The President has appointed Sir Maurice Fitzmaurice Chairman of this Committee. The other members—in addition to representatives of the Government departments concerned—will be Mr. A. J. Ash, Mr. A. Peploe, Mr. A. J. Saner, and Mr. J. T. Williams.

It was reported at last Wednesday's meeting of the Leeds Board of Guardians that the Building Committee had received a letter from the Local Government Board with respect to the return furnished by the guardians of prospective building work to be undertaken after the expiration of the war. The Local Government Board suggested that the guardians should prepare and forward the necessary plans, so that all arrangements might be made for the immediate start of the work when the present restrictions are withdrawn. The chief items of the return are:—Nurses' Home extensions (60 beds), £9,000; imbecile ward extension (60 beds), £4,000; nurses' dining hall (to accommodate 80), £1,250; laundry extension, £1,000; maids' home (to accommodate 32), £4,000.

On "Etchings and Line Engraving" Sir Frank Short gave an excellent hour's lecture at the Royal Academy last Thursday, in connection with the Winter Exhibition of Graphic Art being held there. As Mr. Campbell Dodgson's contribution to the same series is a lecture next Tuesday on "Old Engravings," Sir Frank passed over the historical side of the theme and kept to methods. His illustration, by means of slides, of the aquatint process was made particularly interesting. Incidentally, in reference to the modern practice (which he condemned) of seeking atmosphere in an etching by leaving ink on the plate in printing, the lecturer mentioned that he saw Whistler print his last plates, when Whistler said: "We'll wipe them clean: what was good enough for Rembrandt is good enough for me."

The Commissioners of his Majesty's Woods, Forests, and Land Revenues, in their report dated June 29, 1916, published last Thursday, state that with a view to assisting to meet the national needs for railway sleepers, pitwood, etc., and to reducing the imports of timber, extensive felling and sawing operations have been and are being carried out in several Crown forests. Large quantities of timber have been sold to the Home Grown Timber Committee and others.

Señor Bagaria, whose drawings are on view at the Twenty-one Gallery, York Buildings, Adelphi, is happier than some of the caricaturists who ridicule the German pretensions to "Kultur" and godliness, and all the rest of the virtues. In a very clever drawing (8) he shows a crowd comprising a lion, an elephant, a monkey, and other "Dwellers in the Forest," who, bursting with laughter, cry in chorus "Ho! Ho! Fancy those creatures [the Germans] calling *us* wild beasts." On a bare hillside (6) we see a German scientist of microbic cast in the act of murmuring regretfully, "If *only* I could invent a potato." And the scarcity of the cherished root is further illustrated in the drawing of the woman refusing to give a soldier three potatoes for his Iron Cross. Famine and its cause is the subject of one of the few serious cartoons. Little Willie (the Crown Prince) speaks, "Papa, papa, who is the new enemy knocking at the door?" "Our own people, my child," is the answer.

The Board of Education has issued a Memorandum on the teaching of building in evening technical schools. It reaches us too late to deal with this week, but we entirely concur with the opening statement that "the organisation of building education has not been developed to that degree of completeness which characterises other branches of technical education, such as engineering." We are told that there "will remain ample scope for the teacher to make still further allowances in the organisation of classes and in methods of teaching in order that the instruction may be suitably adapted to the rapidly changing conditions of the building industry." The Memorandum has been prepared by the Board's Inspectors, "who have had experience in the practice of architecture and building, and in the organisation, teaching, and inspection of classes in those subjects in technical schools." It can be had of the usual Government printers and agents for sixpence.

PARLIAMENTARY NOTES.

SUSPENSION OF BUILDING CONTRACTS.—The Government Bill amending the Courts (Emergency Powers) Acts grants relief in connection with the war from liabilities and disqualifications arising out of certain contracts. It gives the Court power to suspend or annul building contracts, the terms of which could not be enforced owing to war difficulties without serious hardship, and affords relief from liability when fulfilment of a contract is interfered with by the requirements of a Government department. One clause gives relief from disqualification for membership of the House of Commons through supplying the Government with certain property for war purposes or receiving compensation for requisitioned property.

The history and architecture of the church of St. Bartholomew-the-Great, West Smithfield, will be explained to visitors on Saturday, March 24, and on Saturday, March 31, at 2.30 p.m. There will be an organ recital at 2 o'clock, and a collection will be made for the restoration fund.

The Accommodation Committee, of which Sir Alfred Mond is chairman, and which was appointed by the Prime Minister, has appointed two honorary inspectors to investigate into the use made by Government departments of the premises occupied by them. The two gentlemen appointed are Mr. R. Leonard Powell, J.P., of Heatherbank, Chislehurst, late of the firm of Messrs. T. J. and T. Powell, Lime Street, London, E.C., and Bermondsey; and Mr. Charles T. Ruthen, C.E., architect, of 33, Furnival Street, Holborn, and Swansea.

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LATEST PRICES.

N.B.—All prices must be regarded as merely approximate for the present, as our usual sources of information are in many cases failing us.

TIMBER.

Owing to stoppage of supplies all prices have advanced considerably.

IRON.

Rolled Steel Joists, English.....
Compound Girders, Ordinary Sections .....
Compound Stanchions .....
Angles, Tees, Channels and Flitch Plates .....
Wrought-Iron Girder Plates ....
Steel Girder Plates .....
Steel Sheets (Single or Double) ..
Steel Strip .....
Basic Bars .....
Mild Steel Bars.....
Steel Bars, Ferro-Concrete Quality (basis price) .....

} Prices controlled by Ministry of Munitions.

	Per ton.				Per ton
Bar Iron, good Staffs	£16	0	0	to £17	0 0
Do., Lowmoor, Flat, Round, or Square, to 3½ cwt.	24	0	0	,,	—
Do., Staffordshire Crown	16	0	0	,,	16 10 0
Boiler Plates, Iron—					
South Staffs	8	0	0	,,	8 15 0
Best Sheffield	9	0	0	,,	9 10 0

Angles, 10s., Tees 20s. per ton extra.

Builders' Hoop Iron, for bonding, £18 10s. to £19 10s.
Ditto galvanised, £32 to £32 10s. per ton.

Galvanised Corrugated Sheet Iron—

	No. 18 to 20. Per ton.				No. 22 to 24. Per ton.
6ft. to 8ft. long, inclusive gauge	£30	0	0	to £30	10 0
Best ditto	32	0	0	,,	32 10 0
Cast-Iron Columns	13	10	0	,,	14 0 0
Cast-Iron Stanchions	13	10	0	,,	14 0 0
Rolled-Iron Fencing Wire	8	15	0	,,	9 5 0
Rolled-Steel Fencing Wire	7	15	0	,,	8 0 0
,, ,, ,, Galvanised	6	5	0	,,	6 15 0
Cast-Iron Sash Weights	7	0	0	,,	7 10 0
Cut Floor Brads	24	0	0	,,	24 5 0
Corrugated Iron, 24 gauge	27	0	0	,,	28 0 0
Galvanised Wire Strand, 7 ply, 14 B.W.G.	14	5	0	,,	—

B.B. Drawn Telegraph Wire, Galvanised—

0 to 8	9	10	11	12	B.W.G.
£10 10s.	£10 15s.	£11 0s.	£11 5s.	£11 15s.	per ton

Cast-Iron Socket Pipes—

3 in. diameter	£7	5	0	to £7	12 6
4 in. to 6 in.	7	0	0	,, 7	2 6
7 in. to 24 in. (all sizes)	7	7	6	,, 7	12 6

[Coated with composition, 5s. 0d. per ton extra.
Turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.				
Cold Blast, Lilleshall	177s.	6d.	to	182s.	6d.
Hot Blast, ditto	115s.	0d.	,,	125s.	0d.

Wrought-Iron Tubes and Fittings—Discount off Standard Lists f.o.b. (plus 2½ per cent.)—

Gas-Tubes	52½ p.c.
Water-Tubes	47½ ,,
Steam-Tubes	42½ ,,
Galvanised Gas-Tubes	35 ,,
Galvanised Water-Tubes	26¼ ,,
Galvanised Steam-Tubes	20 ,,

LEAD.

A licence must be obtained from the Director of Materials (A.M. 2 (E).), Hotel Victoria, Northumberland Avenue, S.W., and should accompany orders for quantities over 1 cwt.

OTHER METALS.

N.B.—Dealings in lead are now controlled by the Government, and for the purchase or use of quantities exceeding 1 cwt. it is necessary to obtain a licence from the Ministry of Munitions.

	Per ton.				Per ton.
Lead Water Pipe, Town	*£39	0	0	to	—
,, ,, ,, Country				,,	—
Lead Barrel Pipe, Town	*40	0	0	,,	—
,, ,, ,, Country				,,	—
Lead Pipe, tinned inside, Town	*41	0	0	,,	—
,, ,, ,, ,, Country				,,	—
Lead Pipe, tinned inside and outside, Town	*43	10	0	,,	—
,, ,, ,, ,, Country				,,	—
Composition Gas-Pipe, Town	*42	0	0	,,	—
,, ,, ,, Country				,,	—
Lead Soil-pipe (up to 4½in.) Town	*42	0	0	,,	—
,, ,, ,, ,, Country				,,	—

[Over 4½in. £1 per ton extra.]

Lead, Common Brands	25	10	0	,, 26	0 0
Lead, 4lb. sheet, English	38	10	0	,,	—
Lead Shot, in 28lb. bags	24	15	0	,,	—
Copper Sheets, Sheathing & Rods	168	0	0	,, 170	0 0
Copper, British Cake and Ingot	147	0	0	,, 150	0 0
Tin, English Ingots	185	10	0	,, 185	10 0
Do., Bars	186	10	0	,, 187	10 0
Pig Lead, in 1cwt. Pigs, Town	33	12	6	,, 34	12 0
Sheet Lead, Town	*38	10	0	,,	—
,, ,, Country				,,	—
Genuine White Lead	*60	0	0	,,	—
Refined Red Lead	56	0	0	,,	—
Sheet Zinc	125	0	0	,,	—
Spelter	93	0	0	,, 110	0 0
Old Lead, against account	26	0	0	,,	—
Tin .....per cwt.	11	10	0	,,	—
Cut nails (per cwt. basis, ordinary brand)	1	2	0	,,	—

* For 5 cwt. lots and upwards.

SLATES.

	in.	in.	£	s.	d.	per 1,000 of
Blue Portmadoc	20 ×	10 ..	11	17	6	1,200 at r. stn.
,, ,,	16 ,,	8 ..	6	0	0	,, ,,
First quality	16 ,,	10 ..	11	15	0	,, ,,
Blue Bangor	20 ,,	10 ..	12	0	0	,, ,,
,, ,,	20 ,,	12 ..	12	2	6	,, ,,
First quality	20 ,,	10 ..	11	15	0	,, ,,
First quality	20 ,,	12 ..	11	0	0	
,, ,,	16 ,,	8 ..	6	0	0	,, ,,
Eureka unfading green	20 ,,	10 ..	15	17	6	,, ,,
,,	20 ,,	12 ..	18	7	6	,, ,,
,,	18 ,,	10 ..	13	5	0	,, ,,
,, ,,	16 ,,	8 ..	10	5	0	,, ,,
Permanent Green	20 ,,	10 ..	11	12	6	,, ,,
,, ,,	18 ,,	10 ..	9	12	6	,, ,,
,,	16 ,,	8 ..	6	12	6	,, ,,

BRICKS.

(All prices net.)

First Hard Stocks	£2	2	0	per 1,000 alongside, in	
Second Hard Stocks	1	16	0	,, ,,	[river.
Mild Stocks	1	14	0	,, ,,	,,
Picked Stocks for Facings	2	14	0	,,	delivered at raily. station.
Flettons	1	13	0	,, ,,	,,
Pressed Wire Cuts	1	18	0	,, ,,	,,
Red Wire Cuts	1	14	0	,, ,,	,,
Best Fareham Red	3	12	0	,, ,,	,,
Best Red Pressed Ruabon Facing	5	5	0	,, ,,	,,
Best Blue Pressed Staffordshire	5	7	0	,, ,,	,,
Ditto Bullnose	5	12	0	,, ,,	,,
Best Stourbridge Fire-bricks	7	0	0	,, ,,	,,
2½in. Best Red Accrington Plastic Facing Bricks	4	10	6	,,	Net, delivered in full truck loads London.

	Per 1,000
3½" Accrington Best Red Plastic Facing Bricks	£2 10 0
3½" ditto Second Best Plastic ditto	2 2 6
Ditto Ordinary Secondary Bricks	1 11 3
Ditto Plastic Engineering Bricks	1 17 6
Sewer Arch Brick, not more than 3½ in thickest part	£2 0 0
3½" Chimney Bricks fit for outside work	2 6 0
3½" ditto ditto through and through	2 0 0
3½" Beaded, Ovolo and Bevel Jambs; Octagons; 2½" and ½" radius Bullnoses; Stock patterns	3 7 6
Accrington Air Bricks, 9" × 2 course deep, each	0 0 6
Ditto ditto 9" × 1 course	0 0 3

Accrington Camber Arches:—

3 course deep 4½" soffit, per foot opening					0 1 3
4 ,, 4½" ,, ,, ,,					0 1 8
5 ,, 4½" ,, ,, ,,					0 2 1
6 ,, 4½" ,, ,, ,,					0 2 6
3 ,, 9" ,, ,, ,,					0 2 1
4 ,, 9" ,, ,, ,,					0 2 11
5 ,, 9" ,, ,, ,,					0 3 6
6 ,, 9" ,, ,, ,,					0 4 6

Net free on rail, or free on boat at works.

GLAZED BRICKS.

HARD GLAZES (PER 1,000).

White, Ivory, and Salt Glazed. Best.	Buff, Cream, & Bronze.	Other Colours.	Seconds Colours.
Stretchers—			
£13 7 6	£12 7 6	£14 17 6	£18 17 6 £13 17 6
Headers—			
12 17 6	11 17 6	14 7 6	18 7 6 13 7 6
Quoins, Bullnose, and 4½in. Flats—			
16 17 6	15 17 6	18 17 6	22 7 6 17 7 6
Double Stretchers—			
18 17 6	17 17 6	21 17 6	25 7 6 19 7 6
Double Headers—			
15 17 6	14 17 6	18 17 6	22 7 6 16 7 6
One side and two ends, square—			
19 17 6	18 17 6	22 17 6	27 7 6 20 7 6
Two sides and one end, square—			
20 17 6	19 17 6	25 17 6	27 17 6 21 7 6
Splays and Squints—			
18 7 6	17 7 6	22 17 6	25 17 6 18 17 6

Stretchers cut for Closers and Nicked Double Headers, £1 per 1,000 extra.

Compass Bricks, Circular and Arch Bricks, not exceeding 9×4½×2⅞ in., of single radius, £6 per 1,000 over and above list for their respective kinds and colours.

The following prices of Special Bricks are plus 12½ %:—

Plinth and Hollow Bricks, Stretchers and Headers—				
5d. each	4d. each	6d. each	6d. each	5d. each
Double Bullnose, Round Ends, Bullnose Stops—				
5d. each	4d. each	6d. each	6d. each	5d. each
Rounded Internal Angles—				
4d. each	3d. each	5d. each	5d. each	4d. each

Camber Arch Bricks, not exceeding 9×4½×2⅞ in., any kind or colour, 1s. 2d. each.

MOULDED BRICKS.

Stretchers and Headers—				
8d. each	8d. each	8d. each	8d. each	8d. each
Internal and External Angles—				
1/2 each	1/2 each	1/2 each	1/2 each	1/2 each
Sill Bullnose, Stretchers, and Headers—				
5d. each	4d. each	6d each	6d. each	5d. each

	Per 1,000
Majolica or Soft Glazed Stretchers and Headers	£23 17 6
,, ,, Quoins and Bullnose	28 17 6

These prices are carriage paid in full truck loads to London Stations.

SAND AND BALLAST.

	s.	d.	
Thames Sand	8	3	per yard, delivered.
,, Ballast	8	3	,, ,,
Pit Sand	9	6	,, ,,
Best Washed Sand	10	0	,, ,,

CEMENT AND LIME.

	s.	d.	s.	d.	Per ton,
Best Portland Cement	45	0	to 48	0	delivered.
Ground Blue Lias Lime	25	6	per ton, delivered.		

Exclusive of charge for sacks.

	s.	d.	s.	d.	Per yard.
Grey Stone Lime	18	0	to 18	6	delivered.

Stourbridge Fireclay in sacks 35s. 0d. per ton at rail way station.

STONE.*

		£	s.	d.
Yellow Magnesian, in blocks	per foot cube	0	3	3
Red Mansfield, ditto	,,	0	2	9
White Mansfield, ditto	,,	0	2	9
Red Corsehill, ditto	,,	0	2	6
Darley Dale, ditto	,,	0	2	5
Greenshill, ditto	,,	0	2	4
Closeburn Red Freestone, ditto	,,	0	2	2
Ancaster, ditto	,,	0	2	0
Beer Stone, delivered on rail at Seaton Station	,,	0	1	1
Ditto, delivered at Nine Elms Station	,,	0	1	7½
Chilmark, ditto (in truck at Nine Elms)	,,	0	1	10½
Hard York, ditto	,,	0	2	0
Do. do. 6 in. sawn both sides, landings, random sizes	per foot sup.	0	2	5
Do. do 3 in. slab sawn two sides, random sizes	per foot cube	0	1	0
Bath Stone—Delivered in railway trucks at Westbourne Park, Paddington (G.W.R.), or South Lambeth (G.W.R.)	per cube foot	0	1	7
Delivered in railway trucks at Nine Elms (L. & S.W.R.)	,,	0	1	8½
Delivered on road waggons at Nine Elms Depot	,,	0	1	9½
Portland Stone—Brown Whitbed in random blocks of 20 ft. average, delivered in railway trucks at Westbourne Park (G.W.R.), South Lambeth (G.W.R.), or Nine Elms (L. & S.W.R.)	,,	0	2	5½
Delivered on road waggons at Pimlico Wharf or Nine Elms Depot	,,	0	2	6,

White Basebed—2d. per foot cube extra.

* All F.O.R. London.

TILES.

	s.	d.	Dlvrd.at ry. sn.
Plain red roofing tiles	42	6	per 1,000
Hip and Valley tiles	5	6	per doz. ,,
Broseley tiles	52	6	per 1,000 ,,
Ornamental tiles	55	0	,, ,,
Hip and Valley tiles	5	6	per doz. ,,
Ruabon red, brown, or brindled ditto (Edwards)	57	6	per 1,000 ,,
Ornamental ditto	60	0	,, ,,
Hip tiles	4	0	per doz ,,
Valley tiles	3	0	,, ,,
Selected "Perfecta" roofing tiles: Plain tiles (Peake's)	46	0	per 1,000 ,,
Ornamental ditto	48	6	,, ,,
Hip tiles	3	10½	per doz. ,,
Valley tiles	3	4½	,, ,,
"Rosemary" brand plain tiles	48	0	per 1,000 ,,
Ornamental tiles	50	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	8	,, ,,
Staffordshire (Hanley) Reds or brindled tiles	42	6	per 1,000 ,,
Hand-made sand-faced	45	0	,, ,,
Hip tiles	5	6	per doz. ,,
Valley tiles	5	6	,, ,,
"Hartshill" brand plain tiles, sand-faced	45	0	per 1,000 ,,
Pressed	42	6	,, ,,
Ornamental ditto	47	6	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	6	,, ,,

OILS.

Rapeseed, English pale	per tun	£28	15	0 to £29	5 0
Ditto, brown	,,	26	15	0 ,, 27	5 0
Cottonseed, refined	,,	29	0	0 ,, 30	0 0
Olive, Spanish	,,	39	10	0 ,, 40	0 0
Seal, pale	,,	21	0	0 ,, 21	10 0
Coconut, Cochin	,,	46	0	0 ,, 46	10 0
Ditto, Ceylon	,,	42	10	0 ,, 43	0 0
Ditto, Mauritius	,,	42	10	0 ,, 43	0 0
Palm, Lagos	,,	32	5	0 ,, 33	5 0
Ditto, Nut Kernel	,,	35	0	0 ,, 35	10 0
Oleine	,,	17	5	0 ,, 19	5 0
Sperm	,,	30	0	0 ,, 31	0 0
Linseed Oil	per gal.	0	4	10 ,,	—
Baltic Oil	,,			—	—
Turpentine	,,	0	4	9 ,,	—
Putty (Genuine Linseed Oil)	per cwt.	0	13	9 ,,	—

GLASS (IN CRATES).

	15 oz.	21 oz.	26 oz.	32 oz.
English Sheet Glass				
Fourths	5d. ..	6d. ..	7d. ..	8½d.
Thirds	5½d. ..	6¾d. ..	7¾d. ..	9½d.
Fluted Sheet	6½d. ..	7½d. ..	— ..	—

	⅛ in.	⅜ in.	½ in.
Hartley's English Rolled Plate	4d. ..	4½d. ..	4¾d.

	White.	Tinted.
Figured Rolled	5d. ..	6½d.
Repoussine	4½d. ..	5½d.
Rolled Sheet	4½d. ..	—
Stippolyte	4¾d. ..	—

We understand that the War Office has abandoned its intention of requisitioning the Library of the Royal United Service Institution for the purposes of the Press Bureau. Not good enough? Got its eye on the British Museum, perhaps? The appetites of our requisitionists grow as rapidly as rapaciously nowadays!

Mr J. Siddalls, borough surveyor of Tiverton, and his staff, were congratulated recently at the town council meeting by Alderman Deering, chairman of the Streets Committee, on the manner in which they have during the past two years carried through their duties, under difficulties, with a diminished staff. The town, he said, had been well kept, and it was due to them that this testimony should go forth.

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TRADE NOTES.

Messrs. Ambrose Poynter and George Wenyon, architects, of 9, South Molton Street, are changing their address next month to 8, Grafton Street, Old Bond Street, W.

Boyle's latest patent "Air-Pump" Ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, E.C., have been employed by the London General Omnibus Co. for High Road Garage, Streatham.

We hear that the architect to the Great Northern Railway of Scotland in building the Palace Hotel, Aberdeen, took the precaution of lining the roof of the vaults under the pavement with Pudloed cement, and the result is most satisfactory. This is worthy of note, as percolation of water in work of this description is a difficulty often encountered, and one which is liable to cause much expense in remedying.

CHIPS.

A chapel is to be built by the Diocesan Board at the Bath War Hospital at an estimated cost of £1,000.

The Board of Inland Revenue have appointed Mr. Carteret Ernest Fletcher to be an assistant secretary in the Estate Duty Office, to fill the vacancy caused by the death of Mr. G. H. Heath.

The Rev. O. W. Wilde, vicar of St. Ives, Hunts, was ordered last Friday by an Ely Diocesan Consistory Court to remove a war shrine which he had put in the parish church of All Saints without a faculty from the bishop.

Nine thousand engravings, including works by Dürer, Rubens, and William Hogarth, which form the famous collection at Wilhelmshöhe, have been given by the Kaiser to the Cassel Art Gallery.

The Loughborough Town Council have adopted a resolution asking the Local Government Board to sanction the raising of a loan of £27,225 to defray the cost of proposed extensions at the electricity works.

At a meeting of the General Purposes Committee of the Birmingham City Council last week it was reported that the total cost of the first and second Council House extensions was £291,633 7s. 10d., and the amount of the approved contracts or estimates £295,284, thus showing a saving of £3,651.

Mr. Samuel Lithgow, founder and head of the firm of Messrs. Lithgow and Sons, prominent Middlesbrough auctioneers, died at his residence, Knoll Villa, Linthorpe, on Sunday week. The deceased gentleman was seventy-two years of age. In 1895 he became a Fellow of the Auctioneers' Institute.

All the men bellringers of Dorking having joined the forces, women have satisfactorily taken their places in the belfry. Half a century ago not a few of the City churches were so served, and not infrequently the lady sextoness and bellringer would conduct the priest from the vestry to the reading-desk.

The diploma of the Institute of Hygiene, with honours, has been granted in general hygiene to William Baskin, Rochester; Benjamin R. Goode, Dover; Ethel Hampson, Nantwich; Bertha E. Hartley, Sheffield; Claude Hill, Lincoln; Flora M. Hodgkins, London, N.; and Eva Ridley, Hove; and in feeding and rearing of children to Louisa Marsden, Cleadon.

Plans have been passed by the Dunfermline Dean of Guild Court for a temporary church and an institute at Rosyth, the former for the Home Mission Committee of the Church of Scotland and the United Free Church, and the latter for the Y.W.C.A. The church will accommodate 450, and the institute will consist of a large hall, dining-room and cubicles.

A plate and stained-glass window is to be placed in Killinghall Church, near Harrogate, to the memory of the late Dr. Woods, who was hon. organist and choirmaster there for twenty-four years. The brass plate is to be put up as soon as it is completed, but the window is not to be erected until after the war. In the meantime the money subscribed has been invested in Exchequer Bonds.

Messrs. Fau and Co., Messrs. Nash and Co., and Messrs. Hindmarsh and Byrne, tenants, of Charterhouse Buildings, were summoned at Clerkenwell Police Court last week by the London County Council for allowing obstructions to exist which prevented free escape from the premises in case of fire occurring there. The defendants undertook to amend the state of affairs complained of, and fines and costs amounting to £4 were imposed.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C., and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

***Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.

Telephone: Gerrard 1291.
Telegrams: "Timeserver, Estrand, London."

RECEIVED.—A. D. D. and Sons—W. F. S. and Co., Ltd.—W. and O., Ltd.—W. C.—J. H. and Co.—L. B. and Sons, Ltd.—M. T. and Sons—W. P. T. and Co., Ltd.—Y. E. P. Co., Ltd.—C. A. Co., Ltd.

T. R. S—No.

S. J.—Practically the same.

B. E. F.—Next week, we hope. 2. Yes.

DISTEMPER.—Rather out of date, and by no means so durable or artistic as Matone.

TO ARMS!

1st LONDON ENGINEER VOLUNTEERS.
Headquarters, Balderton Street, Oxford Street, W.

ORDERS FOR THE WEEK, BY LIEUT.-COL. C. B. CLAY, V.D., COMMANDING.

OFFICER FOR THE WEEK.—Platoon Commander W. J. A. Watkins

NEXT FOR DUTY.—Platoon Commander E. Greenop.

MONDAY, March 5.—Technical for Platoon No. 9 at Regency Street. Squad and Platoon Drill, Platoon No. 10. Signalling Class, Recruits' Drill, 6.30—8.

WEDNESDAY, March 7.—Instructional Class, 6.15. Platoon Drill, Platoon No. 1.

THURSDAY, March 8.—Platoon Drill, Platoon No. 7. Ambulance Class by M.O., 6.30. Signalling Class.

FRIDAY, March 9.—Technical for Platoon No. 10 Regency Street. Squad and Platoon Drill, No. 9. Recruits' Drill, 6.25—8.25.

SATURDAY, March 10.—N.C.O.'s Class, 2.30. Co. Cdr. Castell; knots and lashings.

SUNDAY, March 11.—Special Work at Bombing School. Parade Clapham Junction Station (City and S.L. Tube Railway) 9.45 a.m. Uniform, haversacks, water-bottles. Midday rations to be carried.

EASTER TRAINING will be at Esher. See Special Order.

MUSKETRY.—For all Companies see Notice at Headquarters.

NOTE.—Unless otherwise indicated, all Drills, etc., will take place at Headquarters.

By order,
MACLEOD YEARSLEY, Adjutant.
March 3, 1917.

Two candidates have accepted nomination for the forthcoming election of general secretary to the Amalgamated Society of Carpenters and Joiners—Mr. F. Chandler, retiring secretary, and Mr. J. T. Westcott.

A Board of Fuel Research has been appointed, with Sir George Beilby as director, whose work it will be to investigate the nature, preparation, and utilisation of fuel of all kinds, both in the laboratory and, where necessary, on an industrial scale.

It was reported to the Northfleet Urban Council last week that the owners of land on the Kent side of the Thames from Botany Bay to Gravesend favour the erection of a deep-water pier at Gravesend capable of berthing ocean-going steamers. It was also stated that the South-Eastern Railway Company favour the project, and will be disposed to develop the railway system at Northfleet to facilitate the rapid transportation of goods. The High Commissioner for Australia is giving the scheme his official support.

COMPETITIONS OPEN.

March 3.—Water Supply and Sewerage Scheme (premium 5,000 pesetas—about £200). Manzanares, Spain.—Secretaria del Ayuntamiento, Manzanares.

LIST OF TENDERS OPEN.

BUILDINGS.

March 1.—General Repairs, Painting, etc., to 37, Victoria Street, Norwich.—A. E. Collins, M.I.C.E., City Engineer, Guildhall, Norwich.

March 14.—Construction of Pumping Station Buildings, Chimney Shaft, Approach Road, and other works at Sheerness East.—For the Sheerness Urban District Council, in accordance with plans and specifications prepared by F. W. S. Stanton, the council's consulting engineer.—V. H. Stallon, Clerk, Council Offices, Sheerness.

No date.—Ordinary Works and Repairs to the buildings in the charge of the Commissioners of H.M. Works in the London districts (One Year).—Tenders to be delivered, on a date to be announced, to the Secretary, H.M. Office of Works, Storey's Gate, London, S.W.

ENGINEERING.

March 2.—Dredging work to be carried out in the river Itchen, Southampton.—For the Southampton Harbour Board.—J. E. Palthorpe, Clerk, Harbour Offices, Town Quay, Southampton.

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

FENCES AND WALLS.

March 30.—Wrought-iron Gates and Fencing, for the Central Wharf and Quay Street Landing, Auckland, N.Z.—For the Harbour Board.—The Commercial Intelligence Department, 73, Basinghall Street, E.C.

FURNITURE.

March 2.—From manufacturers only: for 4,000 deal trestle tables. Forms of tender, conditions of contract, and all particulars may be obtained from the Controller of Supplies, H.M. Office of Works, King Charles Street, Westminster.—Secretary, H.M. Office of Works, etc., Storey's Gate, London, S.W.

ROADS AND STREETS.

March 1.—Road Materials (Channel Island Granite, Channel Island Granite Siftings, screened: Pea and Farnham Gravel, Kentish Flints, Cockle Shells, Red Pit Sand, screened Thames Sand and Kentish Rag) (One Year).—For the Commissioners of H.M. Works.—Secretary, H.M. Office of Works, Storey's Gate, London, S.W.

March 1.—Materials and Work (One Year).—For the Wardle Urban District Council.—J. D. Hurst, Clerk, Council Offices, Wardle.

March 2.—Repair of District Roads (One Year).—For the Dorchester Rural District Council.—W. W. Reed, Clerk, 24, High West Street, Dorchester.

March 3.—Supply of from 1,500 to 2,000 tons of Broken X and XX Granite, from 1,500 to 2,000 tons of Broken X and XX Slag and best Slag rejection, and about 250 tons of Slag Dust and Chips for roads in the district.—For the Sibsey Rural District Council.—J. M. Simpson, Clerk, 28, Wide Bargate, Boston.

March 3.—Supply and delivery of Materials (One Year).—For the Cheadle Urban District Council.—J. H. Johnson, Clerk, Council Offices, Cheadle.

March 3-17.—Supplying Materials (One Year): Setts, Kerbs (local stone); Flags (local stone); Earthenware Pipes, Bends, Junctions, Taper Pipes, Traps and Gullies; Pitch and Creosote Oil; White Limestone Chippings; Hand-broken Granite and Granite Chippings; Portland Cement (British standard specification).—For the Heywood Corporation.—G. G. Bourchier, Town Clerk, Municipal Offices, Heywood.

March 5.—Supply of Road Materials, to be delivered at the following railway stations; Six-Mile-Bottom, Dullingham, Newmarket, Kennett, Swaffham Prior, Bottisham, Burwell, Fordham, Soham and Isleham (Great Eastern Railway), at times and in such quantities as may be ordered by the Council or their Surveyor.—For the Newmarket Rural District Council.—F. J. Blackbourn, Acting Clerk, Deva Chambers, Newmarket.

March 5.—Supply and free delivery at Sunbury railway station or a riverside wharf, at the option of the Council, of not less than 500 tons of Guernsey, Cleo Hill, Bardon Hill or Charnwood Granite (broken to pass through a 2½-in. ring; and of not less than 300 tons of Slag Tar-Macadam.—For the Sunbury-on-Thames Urban District Council.—C. E. Goddard, Clerk, Council Offices, Sunbury-on-Thames.

March 5.—Broken Granite, etc., for repair of highways within the Borough of Loughborough (One Year).—For the Highways Committee.—H. Perkins, Town Hall, Loughborough.

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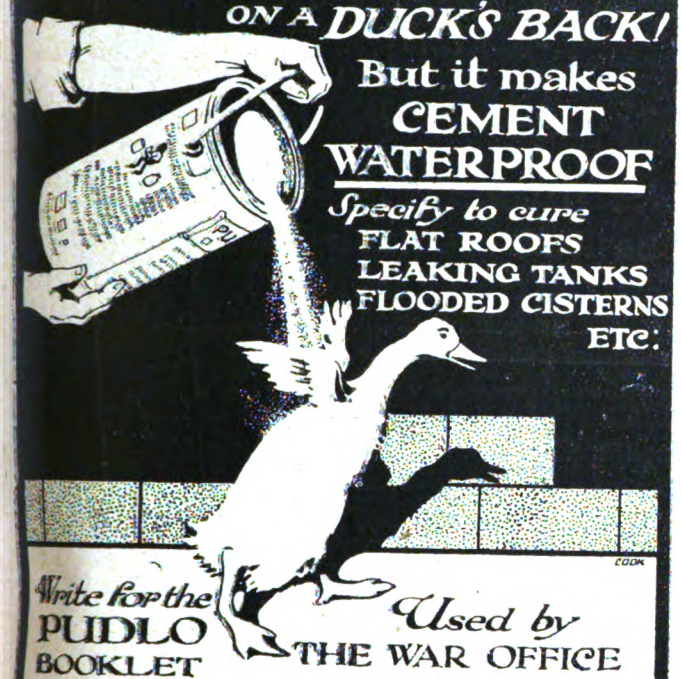

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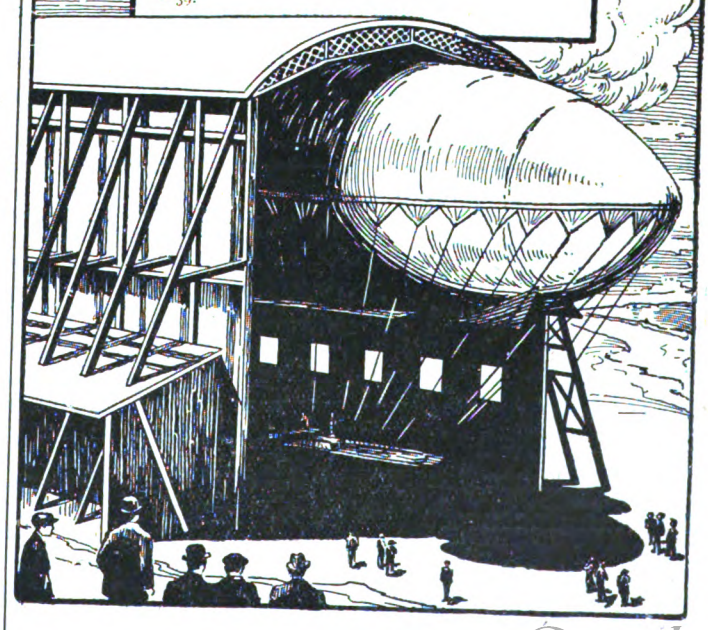

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March 7, 1917. Volume CXII.—No. 3244.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.2.

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OUR ILLUSTRATIONS.

The New Sorbonne, Paris. The principal elevation, Rue des Ecoles; two photographs of the Staircases d'Honneur and two plans of the buildings. M. Henri Paul Nénot, Hon. Corresponding Member of the R.I.B.A., and Royal Gold Medallist, 1917.

Stained Glass: Examples illustrating a paper by Mr. Robert Bayne, read before the Incorporated Institute of British Decorators.

Currente Calamo.

We regret to announce that, solely owing to the scarcity and heavily increased price of paper, the price of this journal will be raised next week to *sixpence*, and thereafter, till the war is over, or till the present scarcity of paper ceases. If, as at present seems but too probable, further restrictions as to supply are forced upon us we shall have to diminish the size; but we are loth to do this while enough paper is obtainable, even at loss to ourselves. The comparatively few subscribers who receive their copies direct by post from the Office will not be charged extra while their present subscriptions last; but all renewals and all fresh subscriptions will be charged £1 6s. per annum, 13s. half-yearly, and 6s. 6d. quarterly, including postage, anywhere in the United Kingdom. We respectfully urge all readers to adopt the course advised in our notice this week at the head of the first column of our front page, or they may fail to get the paper. It is of the highest importance just now to save every possible sheet of paper, and the newsagents cannot be expected to burden themselves with returns of unsold copies nor we to receive them.

We cannot refrain from pointing out that these increases in price, and a probable further decrease in size, are in a great measure due—though surely not intended by the Government—to unfair advantage taken by some of the way in which the restrictions of supply have been framed. Since the limitations were imposed last year we and others have loyally adhered strictly to the proportions of supply allotted to us. But, as the *Westminster Gazette* pointed out last Monday, the orders were so drawn as to foster and encourage a trade or gamble in licences to import and to give to the larger syndicates with capital resources the power of adding to their stocks during 1915 and 1916. The consequence of changing the basis of calculation from 1914 to 1916 is to punish heavily the newspaper proprietors who strove to meet the appeals of the Government. Those who were economical with paper last year are given but one-half of the supply they then used. The forestallers and regraters who by the purchase of licences secured more paper than they were intended to have are rewarded by being given the right to one-half of the additional quantities they thus secured, and in any future restrictions they will maintain that advantage. A worse injustice could not be given the form of Government sanction. The scandal, for it is nothing less, calls for immediate and drastic redress. Mr. G. Roberts stated in the House of Commons the other day that he has taken steps to ascertain what stocks of paper are held in the country. An inquiry to be effective must go beyond the statistics of actual stocks. It must examine into the origin of the reserves. If these have been accumulated by genuine economies in consumption the holder has the fullest right to their possession. If they take their rise in the purchase of additional licences and in scrambles for the oddments purchasable in the open market, then the Government is fully entitled, and indeed bound, to see that there is a fair distribution as between all the interests involved.

Meanwhile, till "possibly no papers at all," judges will differ jocularly about the meaning of the Defence of the Realms Act, and the lawyers will bless the fates which give first those of them whose business it is to help Ministers on the job of drafting Acts of Parliament with holes in them, and then themselves the lucrative opportunities of arguing out the real meaning of such statutes, at the cost of the taxpayer and the ratepayer. The case of the Metropolitan Water Board v. Messrs. Dick Kerr and Co., reported elsewhere in this issue, is a refreshing instance. Probably in the end all concerned will lose money; but while the worried contractors will smart at their own cost, and if so most unjustly, the Water Board will add to its big deficit and the water consumers of London will have to pay. One wonders what comparison the "waste of water" for which the Board threatens to penalise some of us amounts to in comparison with the waste of money on see-saw litigation in which in successive courts, decisions are reversed in the vain attempt to find out what Acts of Parliament really mean?

On Monday a special general meeting of the R.I.B.A. was held to elect M. Henri Paul Nénot, membre de l'Institut de France, as Royal Gold Medallist for 1917. Mr. Ernest Newton, A.R.A., occupied the chair, and proposed the resolution, which was seconded by Mr. E. Guy Dawber, hon. secretary. A representative gathering of Fellows, chiefly, was present, and the motion was carried by acclamation. Mr. Percy Morris, Cates Prizeman 1897, A.R.I.B.A., Devon County architect, and Lieut. Christopher W. F. Wheeler, A.R.I.B.A., of Sutton, Surrey, were elected Fellows of the Institute.

We give elsewhere an interesting paper, by Mr. O. Le M. Knight, B.E., of the Metropolitan Construction Branch of the New South Wales Department of Public Works, which deserves the attention of all concerned in the manufacture and use of Portland cement. It is as well not to shut our eyes to the fact that the disposition evidently increases in the great island-continent State to seek for models in the methods of American architects, engineers, and producers, rather than here. There are probably reasons for this on which it is not our province to dwell; but it is time, perhaps, to ask ourselves whether in this, and in some other matters, we can afford to assume that everything has been done in this country that is possible in the way of perfecting the product that seems likely to bulk more largely and largely in our building and engineering operations. That a good deal has been accomplished of late years is patent to everybody; but we cannot afford to stand still. If we do, a quite unbiassed visitor assured us very recently, American exports of cement to this country and to other markets which we ought to command would increase ere long, given impulse by the continuous publicity the American manufacturer never grudges, to an extent that would disagreeably surprise some of our own producers. A good deal of capital here is invested in Portland cement, and it is desirable that holders should keep their eyes open to what is being done elsewhere.

Economy in ashbins is a little difficult in our own experience, more so owing to the lack of tender treatment by the dustman than to actual wear, but that was not the plea advanced last Monday week at Altrincham before the Altrincham, Cheshire, magistrates, when the Hale

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Urban District Council claimed £1 11s. 6d. from James Haynes Batchelor, of Altrincham, for three ashbins supplied to property owned by him. Defendant having repaired the ashbins thought that was sufficient, and wrote to the Council expressing his surprise that they should require new ashbins at the present moment when the Government requested economy. The Council contended that the requirements of the authority were essential in the interests of health, and that it was true economy that the sanitary arrangements of the district should be kept in order. The defendant said he had on the Court premises two of the ashbins which he had repaired, and he would ask the Bench to say if such repairs were not sufficient, having regard to the present time. He objected to putting new ashbins in while the Government were asking everyone to economise in materials and labour and to save every shilling. He further claimed that the matter was not of a nature to be a sanitary danger. Further, substantial ashbins could not be bought to-day; those that were purchasable were only like tissue paper. The Chairman said a great deal had been said that had nothing whatever to do with the case. This talk about economy was all very well and proper, but one could not economise at the present time with the health of the community. The Council all round had been extremely moderate, and the Bench were quite sure that what was asked for had been essential. An order was made on the defendant to pay £1 11s. 6d. for the ashbins the Council had supplied, and 29s. costs, including one guinea for advocate's fee.

There will be no Autumn Exhibition of Art in Liverpool this year. This decision was reached at last Friday's meeting of the Library, Museum, and Arts Committee, on the motion of Mr. J. Lucas, seconded by Mr. H. Cole. Mr. Lucas and Mr. Cole urged that the exhibition was not necessary for the community, which was sufficiently well served, from an artistic point of view, by the permanent collection. Stress was laid on the shortage of male labour and the difficulties of railway transport. Alderman John Lea proposed, as an amendment, that an Autumn Exhibition be held, provided that the war situation in October warranted it. He was hopeful that the war would be over before October. The amendment was seconded by Mr. F. C. Bowring, who said he could get the Autumn Exhibition run by private enterprise, but he did not like that sort of thing. He hoped Liverpool would run its own exhibition this year. London was this year holding ten art exhibitions, and in the provinces seven were to be held. The Autumn Exhibition would be of advantage, if only as a means of relaxation for wounded soldiers. Mr. H. R. Rathbone thought the permanent collection met all the requirements of the soldiers. Colonel Hall Walker, M.P., who indicated that he would not vote, supported the amendment, and suggested that the exhibition should take the form of a loan exhibition, supplemented by works from the permanent collection. The amendment was lost by four to nine votes, and the proposal not to hold the exhibition was agreed to. We regret it, and hope, as last year, it may be reversed before October.

THE WASTE OF WRONG EMPLOYMENT.

Everybody knows that the chief waste of all kinds of labour is, even in times of ordinary distress consequent on bad conditions of all sorts, not "unemployment" itself, but of employment of the wrong men, and on the multiplication of really unessential and unfit workers, which increases faster than the growth of production or the necessity of work. That is why unemployment has always hit the unskilled among the working classes and the overstocked professions hardest. Turn where you will—to the law, to literature, to architecture, to medicine (before the Insurance Act found good jobs for the panel doctors)—you will find thousands of men whose connection with those callings is only partial. These are either dilettanti, or they are always on the lookout for any fixed salaried employment, no matter what their real qualifications are. With the manual workers, from similar but not identical causes, it is pretty much the same. Lower down the scale you have, as every census shows, hundreds of thousands of men who are not even nominal members of any trade or profession, and at the very bottom of the ladder there is the able-bodied pauper class, the most hopeless of all, and really fostered to keep employed a not much more useful and far more costly body of Poor-law officials, who wink at waste and cost just as much when the workhouses are empty as when they are full.

This will always be so till some really disinterested and clear-sighted administrator recognises the fact. So far the one man who has shown signs of real capacity of insight is Mr. Neville Chamberlain. Of all the people Mr. Lloyd George has called to the nation's aid in this sore hour of national trial, Mr. Chamberlain's task is the hardest. The half-million voluntary workers he wants will mostly be the eleventh-hour sort of men who waited outside the vineyard "because no man had hired them," but nevertheless got their penny a day as well as the rest. How he is to select and grade them—how, as he put it himself, replying to the deputation of architects which waited on him on February 21, as we reported last week, he "is to find the holes into which to put the various pegs," especially when, as he said, "he has got heaps of people who want jobs, but not enough jobs for the people"—it is hard to say. It is all very well to say that a sort of automatic arrangement will sift out the eligibles for the higher branches of work from the applicants at the Labour Exchanges and send them to the Divisional Office, there to be personally examined by a "special officer qualified to conduct the personal examination of the class of men wanted." That "special officer" of the right sort will be mostly wanting.

The treatment of architects since the beginning of the war is the most striking proof of this. We know scores, who—unfit for the Army to which their younger professional brethren had flocked in numbers proportionately greater than that of any other calling—gave up their work and placed themselves wholly and unreservedly at the disposal of the War Office. Not one that we have spoken with has ever been employed on really architectural work, but has been for the most part given work that any junior clerk in a builder's office could have done. It was much the same with the building trades. The General Federation of Building Trade Employers offered help in the procuring and distribution of labour, and was cold-shouldered. The result was bad work and appalling waste, which the military engineers employed had neither the ability to check nor the disposition to report as long as the job was rushed to completion.

The remedy, as far as building goes, was that pithily pointed out to Mr. Neville Chamberlain by Mr. Gass, and we earnestly hope, late in the day as it is, that it will be adopted. The allied societies of architects number amongst their members the most able architects of the kingdom, and, in conjunction with the Architects' War Committee, can and will find the best available men for the work to be done. The suggestions Mr. Gass summarised were:—

That an Architectural Advisory Committee, with representatives in the Allied Societies' Districts, might be appointed.

The Architects' War Committee, with the Allied Societies, will undertake to further extend their Register, classify and recommend for employment experienced architects for control of national building operations and buildings; these to be appointed to positions as required through the Advisory Committee, and as far as possible in their home districts.

When advantage would accrue to the State special arrangements might be made with practising architects to undertake part-time duties in the districts in which they practise.

The special training and experience of architects enable them to undertake all duties in connection with all classes of buildings, and the various works connected therewith, as well as inspection work dependent on the carrying out of drawings and specifications.

When demobilisation occurs, this organisation will be available to assist architects on active service in returning to professional work in civil life.

Just in the same way the General Federation of Building Trades' Employers may be relied on to discover and allocate the best remaining labour left, and to help hereafter, when demobilisation comes, in restoring that labour under proper conditions to its various channels, ready to encounter the awful pile of work which the postponement thereof during the past eight years has accumulated.

We are not competent to speak for the other trades which fill the latest long list of "restricted occupations." There are not a few left out, it seems to us, that are quite as "unessential," and the workers in which might do more useful work than "dig potatoes, or something of that sort." That Mr. Neville Chamberlain may—"late in the day" as he admitted it is—make some real use of the men he asks for is our sincerest desire. And our estimate of his ability is a high one, so high, indeed, that we venture to express our hope and expectation that presently he may be acclaimed by the whole nation as the most likely real "Minister of Labour," of all sorts, to ensure discipline and capability of wise selection according to fitness without favour to any, thus giving us a real industrial army to grapple with the alien as valiantly and effectively as our men are doing to-day on every battle-front.

Mr. John Pratchitt, of Spencer Street, Carlisle, retired engineer, of Denton Ironworks, Carlisle, who died on December 9, left estate valued at £41,545.

Lord Parmoor will open a discussion of Mr. Edwin Savill's paper on the Defence of the Realm (Acquisition of Land) Act, 1916, on Monday, March 12, at the Surveyors' Institution.

Mr. G. H. Polden has been seconded as from January 1, 1917, from the minor establishment to the architect's department of the London County Council, so that he may be temporarily employed on work of the character of that usually assigned to an assistant in the second class.

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STAINED GLASS.*

By ROBERT BAYNE.

I do not propose to touch, except incidentally, on the history, or what might be called the grammar, of glass, both subjects having been worn pretty well threadbare, but rather to deal with its more modern aspects. You will probably feel that the title selected is misleading, as it might imply that the intention is to insist on numerous limitations, whereas, in reality, I desire to plead for greater freedom for the modern craftsman.

The study of old glass, that is to say, more particularly the works of the 13th, 14th, and 15th centuries, whilst being most helpful, and, indeed, necessary, to the student, is such an interesting and fascinating pursuit that I feel many have been obsessed by it, and have turned "old glass" into such a fetish that they insist that the craftsman of to-day should imitate, and even copy, the works they admire so much, not only in general treatment, but also in drawing, colour, and method of painting.

The attempt to conform to this limitation has been very largely the cause of the sham mediævalism that is still to be found in much modern glass, and was almost invariable in early Victorian works, and accounted, in part, for its utter lack of character.

There are certain limitations that the student must bear in mind for the production of really excellent works, and these may roughly be placed under three heads. The first is common to every form of art and craft, and is good taste, the second is that glass, being a form of decoration, must abide by the restrictions that word entails, and the third is the limitation imposed by a frank use and recognition of its materials, lead and glass

There is one important fact that many writers on early glass omit to mention, that is, that none of the ancient glass is now in the condition in which it left the hands of its producer, they voice their great appreciation of it, not as it was, but as it is, and seem to forget that nature has played no mean part in its production, she has painted it—by decay—with a very lavish hand, until what at first must have been thin, and garish to our modern taste, has become a beautiful and deeply toned harmony. If the critics had incited the student to imitate the tone of old glass as we now see it, there would be little to quarrel with them about, but whilst they extol it as it is, they seek to limit us to producing something much more like what it originally was, and, unfortunately, for us there is no example left in anything like perfect or new condition, or I venture to think we should not hear quite so much on the subject.

Unfortunately, in these days, there is no living style of architecture. Buildings are designs of Classic, Renaissance, or Gothic character, with now and again an effort at evolving something new, and usually far from satisfactory. Glass, being a form of decoration, and hence, of necessity, merely a handmaid of architecture, is in much the same quandary, it necessarily follows that, so far as ornamental forms are concerned, it must follow the general characteristics of the building in which it is to be placed, or it may tend to spoil instead of decorate. But, in respect of the figures, costumes, and general treatment, let the art live, and living, progress, surely it is impossible for really fine works to be produced, if so archaic a manner is adopted as to be contrary to the whole tendency of modern life. Present day knowledge is greater in every way than that possessed by the early craftsman, and it would surely be wrong to stultify it by not putting it to practical application, so benefiting by the experience of others. I cannot but feel it would be as reasonable to have the Battle of the Somme depicted in our illustrated papers after the manner of Durer or Hans Burgkmair, with our troops in plate-armour firing arquebuse and mediæval cannon, as to depict our figures, no matter in what age they lived, in 13th, 14th, or 15th Century costume, and drawing merely to suit the style of the building we are decorating. Yet numerous experts insist on this kind of thing being done; they are designing, they say, in 15th Century style, and therefore, whether their subject be St. David, 5th Century; St. Augustine, sixth century; or William of Wykeham, fourteenth century, they represent them in precisely the same costume, with bishop's vestments and tall mitre. The ancient craftsman knew no better, he depicted his figures in the costumes he saw used in every-day life, modern research has given us greater knowledge, and we know that whilst the mitre is correct for William of Wykeham, it was unknown in the days of St. Augustine, as it did not come into use until the 12th century. The correct dress of St. David and all other Celtic Bishops consisted of short chasuble and alb, with occasionally a dalmatic, whilst on the breast was worn a breast-plate similar to that of the Jewish High Priest, and upon the head a plain band or crown of gold; must it not necessarily add to the interest of our work if we depict the persons I have named, each in his crown of gold; must it not necessarily add to the interest of the picture to have the figures therein correctly habited?

Or, again, take the Roman soldiers guarding our Lord's tomb. Are we to represent them in 15th century plate armour? I contend it would be quite as justifiable to imitate the practice of the ancients, go to our own every-day costume and clothe them in khaki. Surely the use of correct costume can but give an added interest, and the sense of style can still be kept, if desired, by general treatment.

Research has endowed us with many other advantages, besides the knowledge of correct costume, and it is our duty to make full use of them. We have the diamond and the even more modern steel wheel with which to cut our glass in place of having to break it by heat roughly to size, and then groze it to correct shape with pliers, as had to be done in times past. In place of the very limited palette of the ancient craftsman, which consisted of but two or at the most three tints of each primary colour, we have to-day glass of every conceivable tint and hue, primary, secondary, and tertiary, each tint graduated from dark to light, and often with two colours, different shades blended or streaked on a sheet, and yet some would confine us to the use of only those colours found in old glass. There is a popular misconception, constantly repeated in the Press, that stained glass is a lost art, and the remark is intended more particularly to refer to colour. Now, I can assure you without fear of contradiction that there is no colour found in old glass that cannot be obtained to-day. Many of you will have noticed a paragraph reproduced in most of the papers a few weeks back to the effect that the lost secret of making ruby glass had been discovered. Certain fragments from the shattered windows of Rheims Cathedral having been examined and analysed, it had been found that ruby was made by flashing the colour on a deeply toned white. Now, certainly for the past thirty years, ruby has been made in this manner in addition to being

JOSEPH OF ARIMATHEA BEARING THE HOLY GRAIL.
(EXECUTED IN STYLE OF THE 13TH CENTURY.)

* A paper read at Painters' Hall before the Incorporated Institute of British Decorators. We are indebted to our contemporary, *The Decorator*, for the use of the illustrations and the report of the discussion.

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flashed on pure white, blue, yellow, and deep green, many of you will have noticed the samples of each that I brought with me this evening for your inspection. There are also on the table specimens to give an idea of the great range of colours at our disposal, as well as some fragments of old works which are exhibited to demonstrate the toning and darkening produced by corrosion, amounting in some places to an actual blackening. In the case of colour, this corrosion has the effect of reducing their brilliancy, thus primary colours may in time attain to secondary or even tertiary effects, and in this way old glass has acquired a greater range of colour than it possessed when first executed, and some parts having resisted the destroying hand of time better than others, a jewelled and brilliant effect is thus obtained by force of contrast.

In these strenuous days we are not content to wait for a few centuries for our works to tone, or we might make our windows with the glasses used by our predecessors. Neither can we well employ so great an amount of pigment as would be necessary to produce the effect of great age on the brightest glasses, we, therefore, make use in some portions of sharp colours, in others, those of more neutral tint, and then tone the whole by a freer employment of pigment in painting in our details than was the custom in earlier ages; and without this free use of pigment it will be found impossible to obtain the mellow unity that is so much admired.

We are told that this use of pigment is wrong, and that we should leave our glass in its purity. Some have attempted to put this theory into practice, and the very latest thing, in fact, an example of "Futurism" in glass, is to be seen in a window recently placed at the west end of St. Mary's, Slough. This work was much extolled in the *Observer* as the finest thing done in the art since the 14th century. It certainly conforms to all the limitations ever imposed, except that of colour, inasmuch as it is pure glass and lead, without pigment—I was going to say without design—of any kind. The newspaper's art critic, however, stated that the theme was Adam and Eve in the Garden of Eden, and, if I remember aright, particularly called attention to the beauty of Eve's hair, and to the theme of the serpent running through the whole composition. To my eyes—doubtless owing to lack of soul—it appeared to be merely a meaningless jumble of full, bright, and, indeed, garish colour. As a proof of its excellence, it was specially remarked that it completely killed the east window in the same church, executed a few years earlier and a good example of a certain style of modern glass. Kill it it certainly does, and so would a bright patchwork quilt kill any old painting, however magnificent, alongside of which it might hang. Time may work wonders on glass such as this, though even that is doubtful, as, apart from dust and dirt, there is not likely to be anything approaching the decay caused by atmospheric and other forces on ancient glass, owing to the much greater hardness of the modern product. Those who are really interested in the subject should see this Slough window, even if they learn nothing useful; a view of it may, perhaps, act as a warning not to depart too far or too suddenly from the traditions handed down to us through the ages.

In the sixteenth century glass departed rather rapidly from the customs of the earlier periods, and, though much of the drawing and execution was admirable, the designers were not so careful in keeping their work in harmony with the architecture; in fact, they often ignored altogether the shape of the lights they were filling. The whole space of a window, say, of seven lights was covered with quarries, on which was placed, like a huge medallion, a canopy and subject; the mullions were ignored. A figure might extend over three of the lights, the body in one, an arm in another, and a leg protruding into a third. Such treatment violates the idea of decoration, inasmuch as it takes no note of the architect's design and is uncomfortable to look upon. It produces a feeling that the figures are too big for the window, not being designed for the spaces that they fill.

During this century backgrounds became very much more elaborate, and a larger quantity of pigment was used, the flesh in some cases being very carefully and deeply painted, and in this respect they more nearly conform to modern practice.

Those who deprecate elaborate painting tell us that windows are primarily intended to admit light. Such a statement cannot be denied; but does it necessarily follow that the argument applies to those made of stained glass? If the greatest amount of light possible is required, plain glass would better suit the requirements. Coloured glass is surely adopted for three particular reasons: to decorate, to instruct, and to modify light, and in some instances the deepest of windows are admissible—for example, at the east end of a church, where the cutting off of the glare which would otherwise dazzle the eyes of the congregation enables the altar and any decoration in the chancel to be better seen. Undoubtedly there is a temptation, in making a window, to get it too dark, as the darker it is the richer and more beautiful is the colour effect that can be obtained, but most of us will admit that a dim religious light can be overdone. Then, again, coloured windows are intended to teach and elevate the thoughts of the beholder, and it follows that the nearer the costume is to truth and the closer our subjects keep to the text, the more interesting and instructive they will become.

The consideration of making our work interesting naturally leads to the question of treatment of backgrounds for our figures and subjects, and I strongly advocate the introduction of what one might call "local colour"; that is to say, landscapes of appropriate character, always remembering that the treatment should be distinctly decorative.

The ancient treatment of, say, the Crucifixion, on a merely diapered ground, or with a screen at the back of the figure, is excellent as a decorative effect, but can we not render the subject much more interesting and more illustrative of the story by suggesting, in the background, the "green hill without a city wall"? And what more decorative objects can you have than sky and trees, both of which lend themselves to the cutting up of the surface, which is so essential in glass work, not only for the production of jewelled effects by the use of broken colour, but also for strong constructional work in the shape of lead. Big masses of plain colour are not pleasing in this art, and should be avoided.

Sky, to some, may suggest blue, but it can be made of any colour, except green, red, purple, yellow or white, or combinations of them, being all equally effective if properly treated. Trees, also, may be practically of any colour that is required in the scheme.

Please do not think that I am advocating purely natural effects; aerial perspective is, fortunately, impossible in glass, leads will assert themselves and cannot be melted into the dim distance.

Single figure compositions also can be made much less monotonous by the introduction of a scene from the life of the saint in the background, as for example, the figure of St. Martin might have as background the incident of his dividing his cloak with the beggar. Treatment such as this adds a sense of mystery, and necessitates a more careful examination to take in details not grasped at the first glance.

We have already considered the popular fallacy of "The Lost Art of Stained Glass." There is, however, one form of glass work

AN EXAMPLE OF A MODERN WINDOW.

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practised in the 16th and 17th centuries, the secret of which is, to some extent, lost; that is, the process of enamelling which consists of burning on to white or coloured glasses of vitreous enamels. The process has been used in modern time, but the enamels are of nothing like so permanent a nature as those found in early examples, neither are they generally so transparent. Speaking broadly, it is, perhaps, a blessing that the method of making permanent enamels has never been rediscovered. You will readily understand what a temptation it would be to many artists to forsake the true tenets of stained glass, and endeavour to produce purely pictorial effects on big pieces of glass by the use of enamels.

"BE THOU FAITHFUL UNTO DEATH AND I WILL GIVE THEE A CROWN OF LIFE."

There are some good-sized examples of enamelled work to be seen in the chapel of Peterhouse College, Cambridge. The windows were, I believe, exhibited in the '62 Exhibition, and have been preserved from decay by covering them both inside and out with plate glass. Beautifuly drawn and painted, with cast shadows and reflected lights, they are extremely pleasing to the average non-technical, or shall we say, uneducated, beholder; but to the initiated, their lack of decorative feeling, total absence of sparkle, and careful avoidance of the limitations of the material, render them unworthy to be spoken of as stained glass, their whole appearance being that of a transparent oil painting.

There is but one permanent enamel in general use to-day, a blue. This is useful particularly in small heraldic works, and there is no doubt other enamels would be of service, providing they were put to legitimate uses and that the temptation to misuse them was carefully avoided. Having dealt somewhat at length with the transparent portion of our materials, let us consider for a moment the opaque part leads. These may be considered from two points of view as our strengthening substance, not alone do they add to the structural durability of our windows, but also give them greater decorative quality and force.

The public often say what a pity it is you have to employ all these leads in the window, how much better they would look without them. Now the truth is the exact opposite of that. At times a draughtsman will draw his figure without leads, and afterwards introduce them; the feeling of strength and character added by the leads is almost inconceivable. They help very largely to give that decorative feeling that is so essential; cross leads also give a sense of flatness of field, which is very desirable in this art, and it will be found that the more they are used in reason the better is the effect.

As to the method of production of windows, we hear a great deal said nowadays about commercialism. All art must have its commercial side. Artists expect, or at least hope, to live by their work; but the term is generally used to express contempt for "firms"—that is to say, the association of several persons together for the better, and possibly cheaper, production of their work. Being a member of one, I may, perhaps, be forgiven for upholding, shall we say, this pernicious system.

It is contended that the artist should not only design, draw, and superintend the work, but that he should personally cut the glass, paint, fire, and glaze it. Why not also expect him to make the glass, lead, and pigments to be used? Let us consider for a moment what such a requirement really means. You probably all know how long it takes—given talent—to design and draw respectably—shall we put it at seven years?—to cut and glaze, so that the window shall be sound and watertight, will probably take the craftsman (allowing for superior intelligence) another three years, and to learn the technicalities of tracing and painting two more would be little enough time, as the process is the exact opposite of working upon paper; lights and half-tones have to be worked out of a matt, not shadows put in.

What was the practice of our forerunners? Did not the great artists have their "schools"—namely numerous pupils—working with them and for them? And there is evidence from the registers of many cathedrals and churches that stained glass was always done by a combination of men, draughtsmen, painters, and glaziers.

There are several advantages in work being done by schools or their modern equivalent, "firms," amongst them are equality of production and the carrying on of traditions, and the larger stocks of material that can be kept from which to choose what is required for any particular purpose. Again, we seldom find all the talents united in one person, and a combination may oft-times produce a much finer result than can be hoped for from the work of an individual. A designer may have novel ideas without being a fine draughtsman, and a fine sense of draughtsmanship is often found without a good eye for colour—the great joy and beauty of glass. After all, what really counts is the excellence of the finished product, and the school or firm system of production ensures at least to some extent a patron getting what he requires, as the peculiar characteristics by which the work of each is recognised are kept fairly constant, great changes only coming with long lapses of time.

There is one other advantage of combination that I might mention, and that is what is known colloquially as "the fresh eye." Most of you will comprehend what is meant by this expression. Those of you who do any drawing have doubtless known what it is to feel satisfied with a particular bit of work, after perhaps having taken greater pains than usual, and yet a friend has pointed out some faults, very unreasonably you may have thought at the time. Probably you have placed the drawing on one side and forgotten it; and after six months or so you have come across it and felt horrified that you could have made such flagrant errors—those your friend had previously pointed out to you—and the quality of the drawing goes down very much in your estimation. It simply means that you have acquired the fresh eye so far as that particular drawing is concerned. In a combination there are plenty of "fresh eyes," and errors stand a very excellent chance of being observed and corrected.

Whilst it is not necessary for the designer of glass to cut and glaze his own work, he certainly should have a thorough technical knowledge of how both processes are carried out and what can and cannot be conveniently executed; this knowledge can be and is acquired by constantly seeing the work in progress.

To sum up, let the student carefully study glass of all ages and styles, look out for the good and beautiful in each; at the same time note carefully what is defective or unpleasing. Having learnt these lessons, let him endeavour, avoiding false shibboleths and eccentricities, to move forward slowly, but surely—guided, but not enslaved, by the traditions of the past.

Then will come real progress in this beautiful craft, which revels in rich, sensuous colour, the thing which, as a nation, we most lack and are indeed afraid of, and which adds more than anything else animation, interest, and poetry to life.

(Continued on page 216.)

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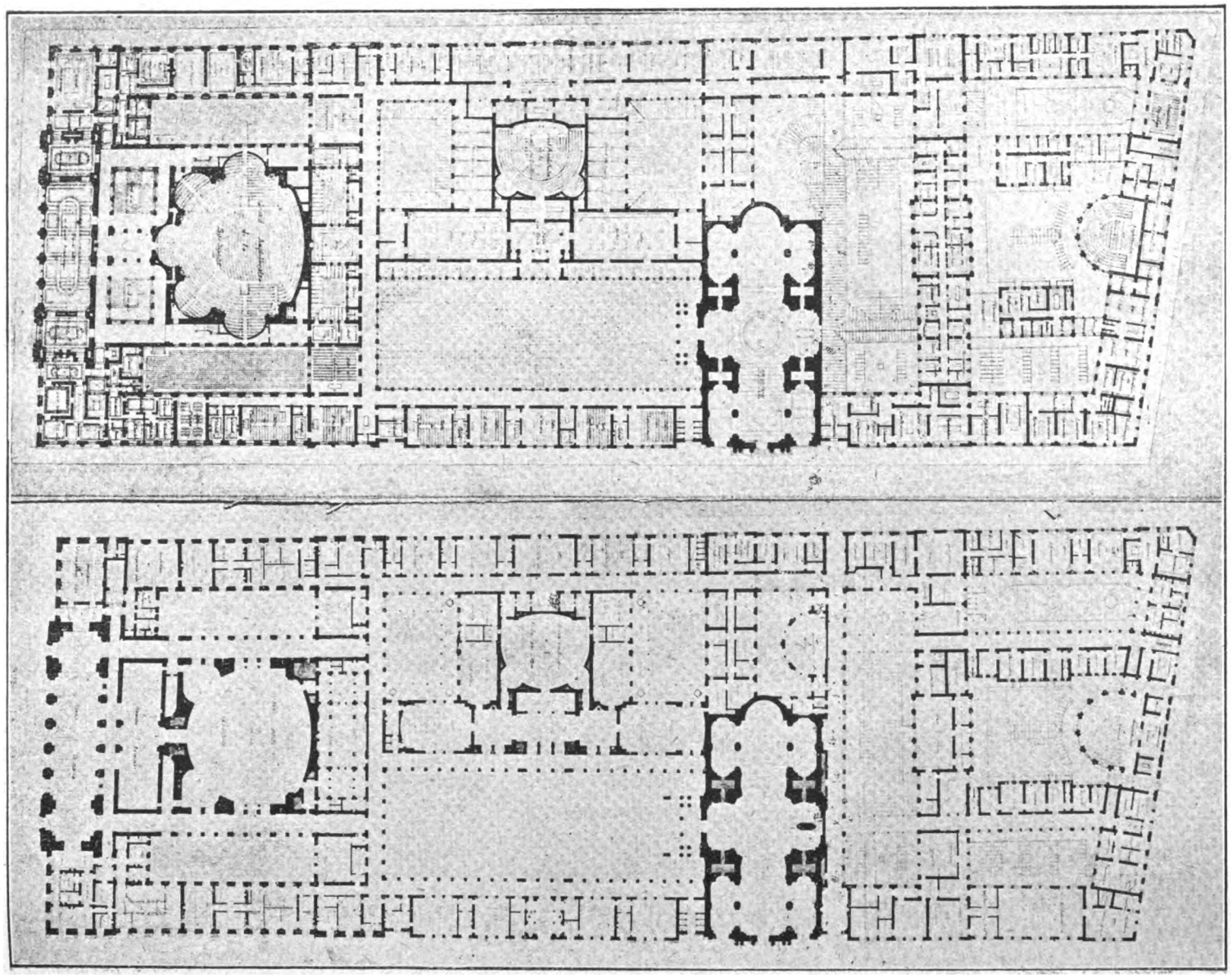

THE NEW SORBONNE, PARIS: GROUND AND FIRST FLOOR PLANS.
M. Henri Paul Nénot, R.I.B.A. Royal Gold Medallist 1917.

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THE NEW SORBONNE, PARIS: STAIRCASES D'HONNEUR (UPPER STAGE).
M. Henri Paul Nénot, R.I.B.A., Royal Gold Medallist 1917.

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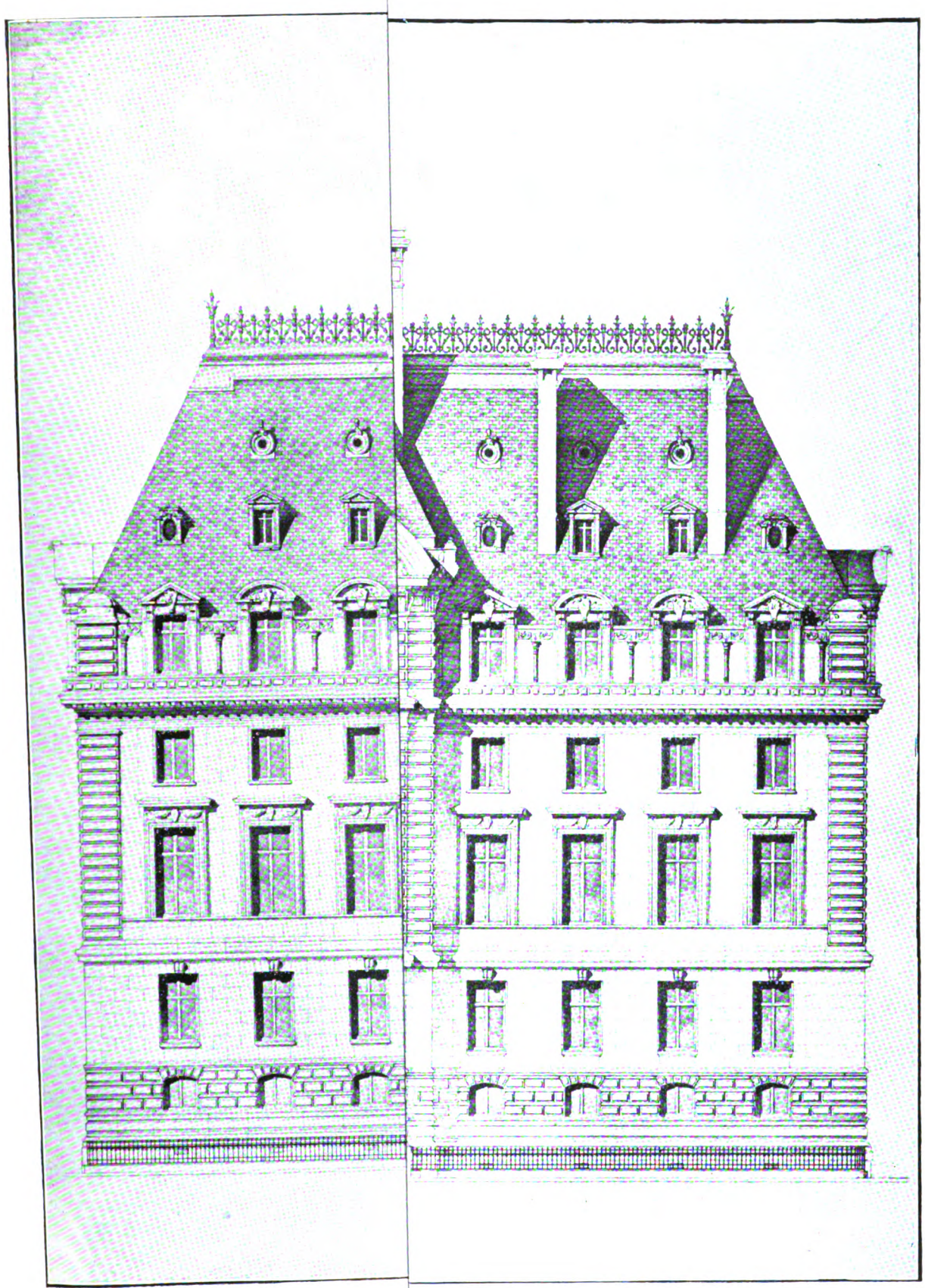

THE NEW ...ld Medallist 1917, Architect.

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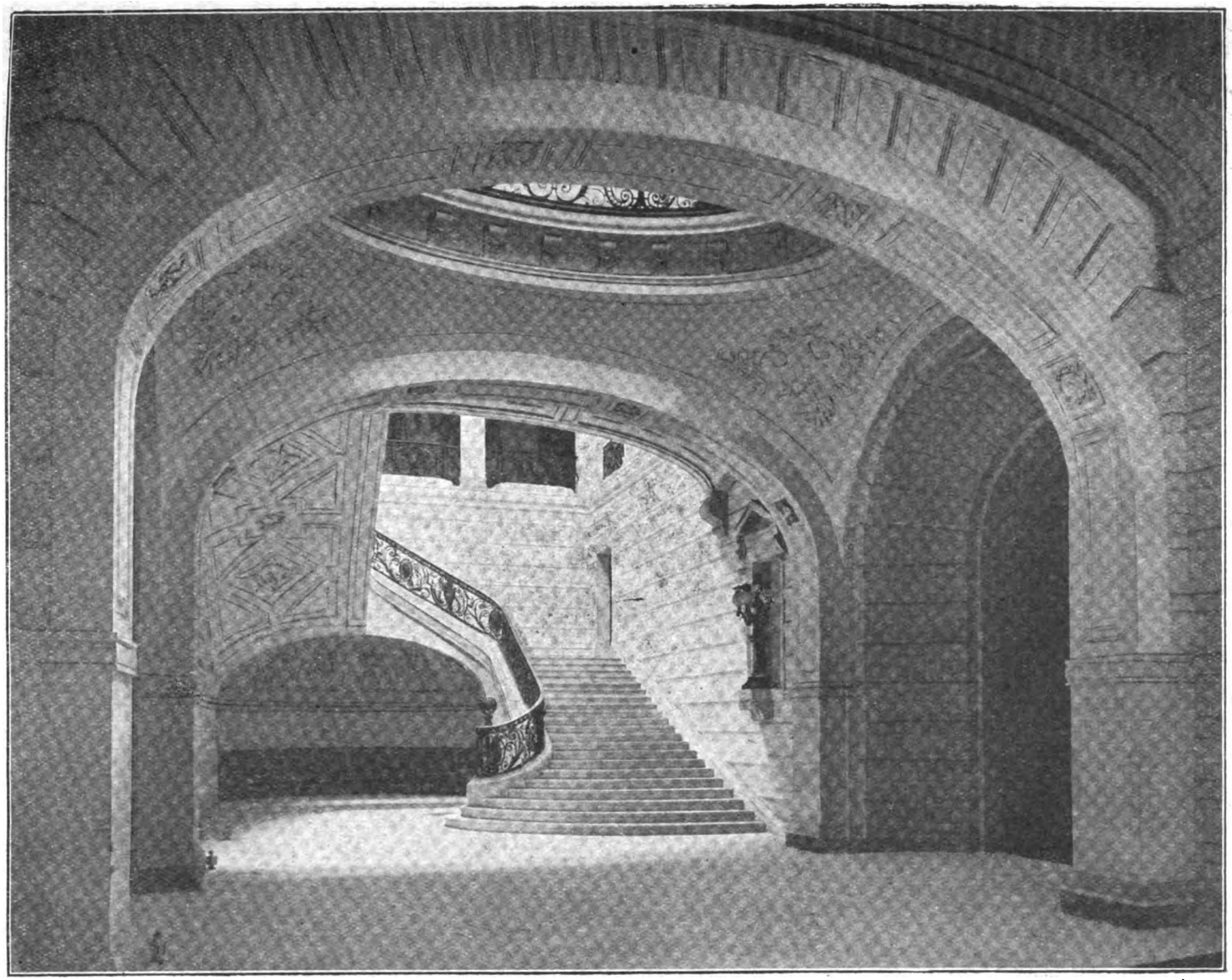

THE NEW SORBONNE, PARIS: STAIRCASES D'HONNEUR (LOWER STAGE).
M. HENRI PAUL NÉNOT, R.I.B.A., Royal Gold Medallist 1917.

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WILLIAM OF WYKEHAM, 14TH CENTURY.

SAMUEL SEABURY, FIRST BISHOP OF THE CHURCH IN AMERICA. MODERN.

COSTUMES OF CELTIC BISHOPS UNTIL THE 7TH CENTURY.

ST. AUGUSTINE'S VESTMENTS ARE THOSE OF A BISHOP FROM 7TH TO 12TH CENTURIES.

STAINED GLASS.—Illustrating Paper by Mr. ROBERT BAYNE.

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Our Illustrations.

THE NEW SORBONNE, PARIS.

The University of the Sorbonne in the modern Rue des Ecoles was founded in 1255 by Robert de Sorbonne, almoner and confessor of St. Louis, who persuaded the King, instead of founding a nunnery on that site, as he intended, to institute a charity. At first it was only a humble college for sixteen poor theological students called La Pauvre Maison, and its professors pauvres maitres; but these soon became celebrated, and the assembly of doctors of the Sorbonne formed a redoubtable tribunal, which judged without appeal all theological opinions and works. The statutes remained in 1790 what they were in 1290. Within its walls the first printing press was set up in Paris. The collegiate buildings were reconstructed by the famous architect Jacques Lemercier for Cardinal Richelieu, who was elected Grand Master in 1662. He incorporated with the Sorbonne the Collège Duplessis, founded by Geoffrey Duplessis, secretary of Phillipe le Long. The little Collège de Calvi was also swallowed up by the site of the church built in 1629-59, with its well known and much-admired stately dome and tomb of Richelieu by Francis Giradon (1594). M. Henri Paul Nénot, whose portrait we gave last week, rebuilt and much improved this immense range of educational buildings a few years ago, and the new Sorbonne is undoubtedly his greatest work. We, therefore, have chosen to-day, from the series of illustrations which he has sent us, the elevations of the main new façade, facing the Rue des Ecoles, the two plans and two photographs of the grand staircases. M. Nénot was elected Royal Gold Medallist for 1917 at the general meeting of the Royal Institute of British Architects last Monday.

STAINED GLASS.

These illustrations will be found in our report on another page of a paper read before the Incorporated Institute of British Decorators, by Mr. Robert Bayne, of the firm of Messrs. Heaton, Butler, and Bayne.

STATUES AND MEMORIALS.

STAMFORD.—On Saturday week, at the west end of All Saints Church, a war shrine in memory of the men from the parish who had died or were taking part in the war was unveiled. The shrine stands a few feet from the west end wall of the church, and is executed in English oak, and consists of three panels framed into moulded posts and framing, supported by curved braces and spurs let into the ground. Over the centre panel is erected a trefoil-headed canopy with carved ornaments protecting the beautifully carved figure of our Saviour making the great sacrifice for the whole world, while on the panel itself are inscribed the thirty-two names of those from the parish of All Saints who have sacrificed their lives for the honour and liberty of their country. The side panels contain the names of 331 parishioners who are at present serving their King and country. The whole shrine is roofed over with oak shingles, hipped at the angles. A shelf for floral offerings extends the whole length of the shrine, supported on moulded brackets. The shrine has been designed by Mr. Wm. Pywell, F.R.I.B.A., architect, of Stamford, and has been executed by Messrs. E. Bowman and Sons, ecclesiastical carvers and builders, of Stamford. Mr. Pywell, we regret to learn, has received intimation that his eldest son, Mr. W. Pywell, has been killed at the Front. He was about thirty years of age, a member of the Honourable Artillery Company, and followed his father's profession.

Mr. Herbert Hodkin, aged 73, of Sheffield, founder and chairman of Messrs. Hodkin and Jones, Ltd., reinforced concrete engineers and building material merchants, has left £300 to the trustees of a Wesleyan chapel at Sheffield, and a total of £22,917.

Derby operative plumbers have been awarded by a Board of Trade arbitrator an advance in wages of 1½d. per hour in lieu of a war bonus of ½d. per hour. They are also to receive overtime pay after 6 p.m. on the first five working days of the week, and after 1 p.m. on Saturdays, with double pay for Sundays and Christmas Day.

STAINED GLASS.

By ROBERT BAYNE.

(*Continued from page* 205.)

DISCUSSION.

Mr. Crace: I am quite sure that you will agree that what I led you to expect was no exaggeration. Mr. Bayne's paper is full of thought and full of knowledge. He has touched on many subjects in which I have been personally interested. Only to refer to his last remark about the advantage of a fresh eye, I can say from personal experience that it is invaluable, and if a man is in real harmony of thought with his partner, the partner can, on looking at his work, invariably give him valuable criticism, which will be to the advantage of the work, and will lead to his own correction of faults which he might in the process of execution have overlooked. I will not occupy your time, as I hope to add a few remarks after any discussion that may follow Mr. Bayne's paper.

Mr. Shuffrey: I should like, first of all, to propose a vote of thanks to Mr. Bayne for his interesting paper, which shows great thought and knowledge of the subject. Stained glass is a thing that one sees so much of. I suppose our churches have been more ruined by the stained-glass artist than any other artist that has entered them, and if you go about the country you will find that there are plenty of windows that are absolutely poisonous, and we still have a very great number of windows that ought to be removed. I do not suppose Mr. Bayne would disagree on that point. These things are generally done by committees, and anybody who has had to do with church committees knows how exceedingly difficult it is, unless you push yourself very strongly, and make yourself very obnoxious, to get a thing carried out. I was very pleased to hear Mr. Bayne say that the principal use of glass is to admit light; I think that wants to be impressed upon all stained glass artists and manufacturers.

I have looked at very many churches up and down the country, and in the early churches one is very much struck by the fact that they must have had very little light indeed. I would certainly emphasise that the first object of a window is to admit light. Tint your light by all means, but I think there is a very great tendency with the stained-glass designer to obstruct too much light. I may say that, if you go to Slough to see the only window that Mr. Bayne has dealt with specially to-night, if you are not satisfied with what you see there, walk on to Stoke Pogis and see the glass there, and I think you will be well repaid for your walk. Mr. Bayne's reference to subdivision of labour reminded me that at the Arts and Crafts Exhibition we have cartoons where the figure was designed by Burne-Jones, and the filling in—at which he was so adept—by William Morris, a combination of work which was a very happy one, as Morris was not very successful himself as a figure painter, and the figures were always done by Burne-Jones.

Mr. W. Stewart Greene: I was hoping that Mr. Bayne was going to tell us something about early glass work. I have not heard of anything earlier than the twelfth or thirteenth century, and I believe some exists in Canterbury Cathedral, also some in Merton College, Oxford, of the fourteenth century. Most of our cathedrals and colleges have examples of the fourteenth, fifteenth, and sixteenth century glass. A great deal of the later dated glass is, unfortunately, as Mr. Shuffrey said, very unsatisfactory. I quite agree with Mr. Bayne when he says that the essence of the craftsman comes in when he blends his colours carefully, and he can to-day, I am quite convinced, produce glass equal to that which was produced in the fourteenth, fifteenth, and sixteenth centuries. I have very much pleasure in seconding the vote of thanks to Mr. Bayne for his paper, which is one of the most interesting and thoughtful we have had.

Mr. C. A. Hindley: I should like to ask Mr. Bayne for a little information, and I am one of those who really need it with regard to stained glass. I have been told that one of the wicked things that Oliver Cromwell allowed his soldiers to do was to smash all stained-glass windows in the churches he entered. Perhaps Mr. Shuffrey and Mr. Bayne are in sympathy with him, but up to now I have not felt very sympathetic about the smashing of those stained-glass windows. I should like to refer to the darkening of churches by the use of stained-glass windows. I suppose it was not any particular disadvantage to the churches in those days to be rather dark, because nobody wanted to read, or could read, in those days, but later on, when people became better educated, and the Bible became more easily obtainable with the introduction of printing, the time came when more light was desirable. I should like Mr. Bayne to explain, if he will, the meaning of the term "flashing colours into glass." With regard to corrosions on the outside of ancient glass, which are very often the only proof of its antiquity—or the principal one—I should like Mr. Bayne to explain, if he will, a little more about the change of colour that takes place from the corrosions of the surface. I think I understood him to say that it may change a primary colour into a secondary colour. I do not quite see how that can be. I can understand a primary colour being lowered in tone by the addition of black through corrosion. Again, will Mr. Bayne kindly tell us why stained glass is usually so very thin. Plate glass, of course, can be cast to any thickness. There is a disadvantage in thin glass, because it allows the cold of the outside air to chill and cool the air inside the building. I have myself noticed this in some churches, although the windows are in perfect condition.

Mr. Bayne: With regard to flashing glass. This applies more particularly to ruby, although there is also flashed blue and flashed purple. The flashing is done when the glass is hot. I cannot tell you what the technical method of doing it is, but the glass-blower blows a bubble of ruby, which is of very intense nature, into the white glass so that the white glass is coated with a thin ruby film. With regard to corrosion, what you say is perfectly accurate in a way; but what I meant to infer is that if you get a very brilliant glass, corrosion will very much alter and modify it.

With regard to the thinness of stained glass, I do not think that good stained glass is very thin—that is to say, good antique glass. There would be one very great objection to having it very thick, and that is the enormous weight that the leads would have to bear. But some glass runs well over ¼ in. thick. If you have an enamelled window, you can have it built up of plate glass and have your colour enamelled on it, but it is very poor stuff.

Mr. Crace: Perhaps it would be as well now to sum up the discussion and make a few remarks on Mr. Bayne's paper. With regard to the question as to why plate glass is not used for staining, Mr. Bayne referred to one reason—namely, that of its enormous weight. I do not know whether Mr. Hindley has ever handled a stained-glass window—even of thin glass—but he would find it was a very heavy article to handle. Another reason, however, is that plate glass will not take stain. The glass which is used in stained glass is quite a distinct material.

With regard to Mr. Shuffrey's point as to obstruction of light, one of the speakers very correctly said that when people had neither Prayer-books nor Bibles to read, light was not so much an object in the early churches—and that is very true; but it must be remembered that from the thirteenth century onward windows were of an enormous size, some 100 ft. high and 50 ft. wide, with mullions and tracery on purpose for the exhibition of stained glass. Of course, in the early days windows were not so large, and the stained glass was of a deep colour; but then, as has been correctly said, the congregation did not read; what they did read was the subjects on the glass. If you look at the windows in any church of the fourteenth or fifteenth century, the windows are very often more extensive than the stone which supports and surrounds them; they were erected on purpose with a view to putting stained glass in them. I was very glad that Mr. Bayne took the line he did, that to imitate antique glass to the extent

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of imitating the antique drawing of the figures is preposterous folly. The men who designed what we call quaint figures in stained glass did their best; they drew as well as they could—they could not draw better. They did not draw with such limitations and such awkward angles because they thought it the best thing to do, but because it was the best they knew. The man who in recent times has studied from the life, and knows what the human figure is like, is not to be pardoned for harking back to the quaint and often ill-drawn figures of the thirteenth century. The figures were mostly drawn by monks—and monks did not study from the nude. That is, perhaps, a necessary explanation. Archæological accuracy of costume to which Mr. Bayne referred is very essential in connection with stained glass; it gives the proper impression and leads a person's ideas in the right way because it may be assumed that they will meet with the correct representation of the costume of any period, in other places, and on other occasions. For instance, I remember having seen a picture by Rembrandt of the soldiers casting lots for the garments of Christ, and one of the soldiers was smoking a clay pipe. I don't think that that gives a very clear idea of the Roman soldier in Palestine. With regard to the point raised by Mr. Bayne of carrying the subject or figure across the mullions, I think it is always disagreeable, and certainly undecorative, because after all, the mullions were there before the picture, and it was the artist's business to fit his picture into the field he had to deal with.

The subject of division of labour in art, as in all other matters, is a very important one. It is ridiculous to say that one man should do everything. If a man is cast on a desert island and has to build his own hut, and make his own clothes, and find food all by his one hand, obviously he has a hard bit of work to get through and cannot do it well; but where labour is properly divided it is a great advantage in all ways, but, of course, there are abuses of such methods. When one finds a single process of manufacture done by the same person, it is well done. But this is not the case with art. In all probability the man who cuts and pieces the glass to a particular design or drawing, could not himself have drawn the design and in the same way in the other processes; it would be absurd, for instance, to ask the man who did the drawing to do the leading up, which requires considerable knowledge and technical dexterity. I am in perfect agreement with Mr. Bayne when he says that a certain division of the work of preparing a stained glass window is not only desirable, but absolutely necessary for success; and I have no reason to think that at any period it was not so done. One of the speakers—Mr. Stewart Greene, I think—alluded to the date of glass in this country, and said there were no windows earlier than the 12th or 13th century. I think you may put the date at the 13th century. Unfortunately, a great deal of our early glass was destroyed; a great deal quite wilfully—the windows were taken out and destroyed simply because they were dark windows. I do not think there is any glass in Europe much earlier than 13th century, and there is no doubt that the manufacture first started, or was first brought to anything like perfection in France. There are windows in North Italy executed by William of Marseilles, who, I think, was the first recorded glass painter, in the 13th century, and eventually his glass was sought after by various countries in Europe, but apparently manufactured at Marseilles, so that it is no good looking for windows earlier than that, because I do not think they exist. It is worth mentioning in connection with artistic drawing on stained glass that in Italy there are beautiful windows in stained glass in which the drawing is as correct as if it were on a canvas or panel.

With regard to the leads, these are, of course, absolutely necessary in putting the glass together. There is no doubt that the leads in the transmitted light become very much smaller to the view than when handled, but they are an essential part of good stained glass, and act as outlines, and, to a certain extent, tone down the general colour. I need hardly allude to such a building as Chartres Cathedral, but all who want to see good stained glass should pay a visit to this church. It is the only great church in Europe that I know that is entirely glazed with the most beautiful stained glass, and that gives one an opportunity, at any rate, of judging what the artist of the 13th century aimed at. He aimed at giving beautiful harmony of colour as the principal object of the window, and made the window what he considered large enough to admit sufficient light in spite of the stained glass.

I have listened to Mr. Bayne's paper with great interest. Apart from his knowledge of glass, Mr. Bayne has an excellent knowledge of decoration, and I should say that there is no better school for the study of harmony of colour than the school of learning the treatment of stained glass. There you have necessarily powerful colours combined and brought together in a way that you can never study on a flat surface, or at all events, never are obliged to study on a flat surface. The knowledge attained by the study of stained glass must give a man a command of the harmony of colour put into practice, which no one can better obtain in another way. I have much pleasure in conveying to Mr. Bayne your vote of thanks, and I am sure this vote expresses the feeling of the company for the great pleasure he has given us to-night.

Mr. Bayne: Mr. Crace, ladies, and gentlemen, I thank you very much indeed for your vote of thanks. If my few remarks have met with your approbation this evening, I am amply rewarded. I may say that with regard to the date of old glass there is supposed to be one piece of 12th century glass at Le Mans, and I think that is the only bit of 12th century glass. It is only a small piece, but it is a most interesting piece, and contains the most beautiful old ruby I have ever seen. The 13th century ruby is not in it.

NOTES ON RECENT AMERICAN CEMENT PLANT PRACTICE.*

By O. LE M. KNIGHT, B.E.
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The Portland cement manufacturing plants in the United States and Canada at the present time have an output of over 300,000 barrels per day. An analysis of recent cement directories shows that 90 per cent. is being manufactured by the dry process, less than 10 per cent. of the output being manufactured by the wet process. Of these plants using the wet process, some are working on more or less wet materials, while others are purposely adding water to dry materials with the idea of obtaining a better mix and more perfect regulation of the composition of the material being fed to the kiln. None of the larger plants, however, are included among those using the wet process.

An examination of the fuel provision for the production of this cement shows that about 75 per cent. of the output is being burned with pulverised coal for fuel, approximately 15 per cent. with oil fuel, and the remainder, or 10 per cent., with natural gas. Those plants burning oil are confined to the oil producing districts, mainly on the West Coast, and those using natural gas to Kansas.

The total power plant capacity of all these plants varies between .5 h.p. per barrel per day and 1.8 h.p. per barrel per day, the average being .98 h.p. per barrel per day. Only twelve plants out of over 150 have power-house capacity outside the limits of .75 and .25 h.p. per barrel per day.

It may be interesting to note that the capitalisation (per barrel per day capacity) varied between the rather wide limits, £55 16s. and £550, the average being £156 10s. The average capitalisation of the wet plants was slightly higher than the general average, and amounted to £173 per barrel per day capacity.

The wide range of values found is to be expected from the fact that widely different conditions exist as to the locality of the plant, with great variations in the amount of capital to be expended for the quarry sites. It might be noted, however, that in those plants where the capitalisation was particularly high only a portion of the stock is indicated as having been issued.

In the following pages the writer has endeavoured to present a few of the interesting features of American cement plant practice, and to indicate those lines upon which development is taking place.

CONSIDERATION OF WET AND DRY PROCESSES.

From the fact that such a small percentage of the cement produced in the United States is produced by the wet process, it would appear that there is a decided economic loss in the employment of the wet method for other than wet materials, which more than compensates for any probability of a better mix being obtained; and the following examination of the coal requirements for a raw material containing 10 per cent. moisture shows this to be the case.

We may regard 30 per cent. moisture as a minimum figure for the wet method—percentages as low as this are generally considered semi-wet—but are workable.

The question of a better mix being obtainable with the wet process than with the dry seems hardly open to discussion, as the best cement in the United States is being produced by the dry method. It would seem that the probability of securing a better burned clinker by the dry method, due to the wet slurry balling up into larger masses than the dry feed, would offset any previous slight superiority in the mix if such existed. The amount of raw material lost through being carried out by the waste gases is, of course, slightly greater from the dry kiln than from the wet.

In the discussion of the merits of wet and dry processes, the following points must be kept in mind:—

1. With careful design the only difference in efficiency between a rotary dryer and the top end of a rotary kiln acting as a dryer, should be that caused by radiation loss as the gases pass up the kiln to their point of application—this difference may be taken as 5 per cent.—the efficiency of the dryer as being 60 per cent. and of the kiln as a dryer 55 per cent.

2. The amount to which the wet kiln utilises hot gases that would be wasted in the dry kiln depends on the temperature to which these gases can be reduced.

3. The additional heat required to dry the wet mix must be supplied by burning coal, under the same conditions as a dryer with somewhat reduced efficiency.

4. It is necessary to add water to the raw materials to bring about a suitable condition for wet working. Where the initial moisture is great enough to use no additional water, there is, of course, no case for the dry kiln.

DRY PROCESS

The amount of dried raw material required for one barrel of cement = 600lb. So that with 10 per cent. moisture this represents 90 per cent. of the weight of the raw material before drying.

Weight of undried raw material = 600 ÷ 90 = 666 lb.

Weight of water = 666 − 600 = 66 lb.

This moisture must be driven off in a separate rotary dryer. Such a dryer has an efficiency of about 60 per cent. (7 lb. water evaporated per lb. coal burned being a figure that is obtained in practice with a properly designed dryer.)

The amount of coal necessary to dry the material for one barrel cement is therefore 66 ÷ 7 = 9.43 lb.

The amount of coal required to burn one barrel of cement by the dry process may be taken as averaging 90 lb.

The total coal required to dry the material and burn the clinker for one barrel cement therefore equals 9.43 + 90 = 99.43 lb.

Heat in stack gases will be as follows:—

Products of combustion from coal at 15 lb. per lb. coal	= 1,350 lb.
CO^2 driven off from material	= 220 lb.
Total	= 1,570 lb.

These gases will have a temperature of 1,000° F. and a specific heat of ·24.

So that head carried out by the stack gases = 1,570 × 1,000 × ·24 = 376,800 B.T.U.

* From the Sydney (N.S.W.) Government Report of the Department of Public Works.

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Summarising the above results we see that the dry plant is burning 99·43 lb. of coal per barrel, and is sending up the stack gases whose heat value is 376,800 B.T.U.

WET PROCESS.

Considering the same material manufactured by the wet process. The percentage of water must first be brought up to 30 per cent. to allow for working.

The total weight of the wet raw material for one barrel will then be 600 ÷ 7 = 857 lb.

Amount of water = 857 − 600 = 257 lb.

This water must be driven off in the upper end of the rotary kiln, partly by utilising the heat of the waste gases and partly by the burning of additional coal.

With 30 per cent. moisture 600° F. is about the lowest temperature obtainable for the stack gases.

The coal required to actually burn one barrel of cement will, of course, be the same as in the dry kiln, and equals 90 lb.

The products of combustion from this fuel, however, equalling 1,570 lb., leave the wet kiln at only 600° F., and carry out with them 1,570 × 600 × ·24. = 226,080 B.T.U.

The difference between the heat lost in the products of combustion of this fuel in the dry and wet kilns represents heat used in evaporating portion of the moisture in the wet material.

This heat equals 376,800 − 226,080 = 150,720 B.T.U.

The water to be evaporated from the wet material was shown to equal 257 lbs. per barrel of cement.

The heat required to evaporate this = 257 × (970 + (212—70) = 285,784 B.T.U.

(70° being the initial temperature of the material).

(970° being the latent heat of evaporation of 1 lb. water).

Of this 150,720 B.T.U. is supplied from waste gases, leaving 285,784 − 150,720 = 135,064 B.T.U. to be supplied by burning additional coal.

If the efficiency of the kiln as a dryer be taken as 55 per cent., and the calorific value of the coal is 13,000 B.T.U. per lb., the useful heat per lb. of coal = 13,000 × .55 = 7,150 B.T.U., the amount of coal therefore required to furnish the necessary 135,064 B.T.U. equals 135,064 ÷ 7,150 = 18.9 lbs.

The total coal used in the wet process to evaporate the moisture and burn one barrel of cement = 90 + 18.9 = 108.9 lbs.

The total coal used in the dry process to evaporate the mosture and burn one barrel of cement = 90 + 9.43 = 99.43 lbs.

The wet process therefore requires 9.47 lbs. more coal than the dry process, or 10½ per cent.

It may be shown that under the conditions assumed—viz., 30 per cent. moisture in wet mix, 600° F. and 1,000° F. stack temperatures for wet and dry kilns respectively, the amount of coal burned in either process is the same when the initial moisture in the raw material equals 18 per cent.

It should be pointed out, however, that in selecting the above conditions an exceptionally efficient wet kiln was taken, both as regards its drying efficiency and its low stack gas temperature. In practice on average dry materials containing about 4 per cent. moisture, it has been found that the wet process requires about 24 lbs. more coal per barrel than does the dry process.

The statement made earlier that whenever water has to be added to make a workable slurry, the wet process will be less efficient than the dry process, is thus borne out.

THE ROTARY KILN.

In no part of the cement plant equipment has more apparent progress been made since the introduction of the rotary kiln than in the development of the kiln itself. The earliest successful rotary kilns, of about 6 feet diameter by 60 feet length, continued to represent standard practice until only a few years ago, the first step towards the introduction of larger kilns being made by Edison, who installed kilns 10 feet diameter by 150 feet length, made in fifteen cast-iron sections, and supported on as many sets of carrying rollers. Since then there has been a steady trend towards larger and larger kilns, until at present there are in operation kilns 12 feet diameter by 240 feet length.

Standard practice in the United States today, or, rather popular practice, is represented by a kiln 8 to 9 feet in diameter and 135 feet to 160 feet length, the 8 feet by 145 feet kiln being quite a common size. A kiln of this size will burn 700 barrels of clinker per day, and has been known to produce between 850 and 900 barrels.

Such kilns present many interesting problems in design, by reason of the great weight to be supported on bearings, and the peculiar conditions as to heat and loading. They are usually carried on two to four sets of carrying rollers, the two-support kiln being very largely used in the United States.

That such long kilns can be satisfactorily carried on two supports is borne out by practice. A limit to the size of the kiln that can be satisfactorily carried in this manner is determined by the pressure on the riding rings and carrying rollers, and would probably be found in a kiln 12 feet diameter by about 200 feet long.

The advantage of the two-support kiln becomes apparent when a study of the bending stresses in kilns is made. Such a kiln is the simplest form of overhung beam, unaffected by a moderate settlement of either support or by distortion of the kiln shell, due to the temperature or other causes, whereas, while a three or more support kiln may show small unit stresses as an ideal continuous beam, these stresses may be shown to increase enormously when a settlement of any support takes place or distortion of the shell occurs, such distortion tending to lift the kiln off one of its supports at some period of its rotation. That this does take place in the operation of multiple-support kilns is evidenced by the fact that such kilns have a habit of continually shedding rivets.

Designs have been worked out by at least one prominent firm of cement machinery manufacturers in the United States for a yielding or constant reaction support whereby the advantages of the additional support are obtained, and disadvantages due to distortion of the kiln overcome by the fact of the support not being rigid, but capable of adapting itself, within a predetermined range, to any movement of the kiln shell.

So far as the writer is aware, no installations of such a mechanism have yet been made, but it would seem to be the rational way of treating the problem of the three-support kiln.

Carrying Mechanisms—The increase in the size and weight of rotary kilns has of necessity been followed by improvements in the method of supporting them. Four carrying rollers in each roller frames have supplanted the earlier two-roller support, and in order to ensure each roller taking its share of the weight, they are mounted in pairs in adjustable equalisers. These equalisers are frames in which a limited amount of rocking is allowed, and which are adjustable within the main frame by means of removable steel blocks and adjusting screws. The attached photographs very clearly show the mechanism as in use on 8 ft. and 10 ft. kilns. It will be seen that they provide an efficient means of adjustment, and a simple method for removing the equalisers with their carrying rollers, it being only necessary to take the removable blocks from their pockets in the frame and the equalisers can be slid off. The carrying rollers are open hearth steel castings, and are pressed into their shafts with a taper fit. The bearings are bronze lined, and care is taken to ensure their being perfectly dust proof.

Mounted on the upper carrying roller frame are two thrust rollers which serve to take the thrust of the kiln due to its inclination —usually, however, they are relieved of much of this thrust by giving the carrying rollers a slight inclination, so that they exert an upward tractive force on the kiln.

The inclination at which kilns are set varies from ⅛ in. per foot to ¾ in. per foot, ½ in. per foot being most commonly used. The inclination of the kiln, combined with the speed at which it is rotated, determine the rate at which the material will flow through the kiln, and it is largely a matter of experiment for each plant to determine the rate of revolution necessary, not only to insure correct burning, but also to prevent the formation of a clinker ring in the burning zone, due to incorrect rate of travel of the material in the kiln.

The rate at which the kilns are run varies from one revolution per minute to one revolution in three minutes. In kilns whose inclination is ½ in. per foot the rate usually varies from one revolution in one minute twenty seconds to one revolution in two minutes thirty seconds, the material in the kiln advancing about 20 ins. per revolution.

Dust.—A feature of rotary kiln installations that has received much attention of late has been the provision of means to reduce the amount of raw material being carried out of the kiln as dust. In some plants this loss is considered to be as high as 6 or 7 per cent. To prevent this, the opening in the stack end of the kiln should be reduced to an amount sufficient to reduce the velocity of the gases through the upper portion of the kiln to as low a figure as possible, and still prevent the flame backing out around the firing hood. Under these conditions the greatest time is allowed for the heat in the gases to be absorbed by the material, and the least amount of powdered material is carried out into the stack base.

To cause the material carried into the stack base to be deposited instead of being carried up the stack has been the object of much attention, and some very elaborate and costly dust-collecting chambers designed to effect this have been erected.

The reason for this lies not only in the actual loss of material, but as cement plants come nearer the centres of habitation the deposit of this dust in the adjacent country is very objectionable. In some parts of the United States this has been the object of legislation, with the result that plants have been obliged to try various methods for dust prevention.

The necessity of large settling chambers between the end of the kiln and the stack is quite evident, though care must be taken in their design to insure the gases depositing the dust. The mere provision of space in which the gases may expand and lose their velocity is inadequate, there being a tendency for the gases to flow at their high velocity through the centre of such spaces and only lose velocity near the walls. Large dust chambers have been introduced in many plants, one of the largest of which is shown in an accompanying photograph, but, though their necessity is proven, they are still in a developmental stage. As has been said, something more than a mere provision for expansion seems necessary to retard the gases. This may possibly be accomplished by a judicious arrangement of arches and walls, or it may be necessary to introduce some means such as hanging wires or cords, which will offer an efficient resistance to the flow.

The writer believes that electrostatic separators have been tried in one cement plant in California.

Efficient means for removing the dust deposited in the settling chambers should be provided. In some of the plants recently built a series of screw conveyors running in troughs in the chamber floor have been installed.

The writer has not yet been able to learn the results obtained by several plants which erected special dust chambers within the past year.

FUEL.

The fuel used for burning Portland cement in the rotary kiln must be of a gaseous nature, to permit efficient injection and burning, which limits us to the use of pulverised coal, oil, natural gas, and producer gas.

As has been pointed out, over 75 per cent. of the cement produced in the United States and Canada is burned by pulverised coal.

Oil is, perhaps, the most convenient fuel to use, but in most localities its cost is prohibitive. It is now used only in those parts of the United States where it is abundant, and where coal is expensive. The common method of introducing it into the kiln is through three or more nozzles or atomisers at about 10 lb. oil pressure, and 12 oz. air pres-

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sure. The consumption per barrel of cement burned is about 12 or 13 gallons of oil.

Natural gas is used at a few plants in districts where it is plentiful, particularly Kansas. It was previously used in some of the eastern plants, but increase in cost caused its rejection in favour of pulverised coal. The gas is generally introduced through some special type of burner, in which it is thoroughly mixed with air, the gas pressure being usually from 3 to 4 oz.

Producer gas is not now used in any cement plant in the United States, so far as the writer is aware. It has been sufficiently used to demonstrate its suitability for burning cement clinker, but has always been found uneconomical.

Only 70 to 80 per cent. of the coal burned in the producer gets to the kiln as gas, whereas all the coal is burned when injected in pulverised form. Also the cost of gasifying is considerably more than the cost of drying and grinding the coal, the producers requiring a good deal of attendance and showing very high labour costs. Furthermore the quality of the pulverised coal does not show as great a variation as does producer gas, and therefore permits a better regulation of the flame. It is possible that in districts where lignite or a very poor quality of coal is the only fuel obtainable the producer might be used satisfactorily.

Coal.—Methods of burning powdered coal in the rotary kiln have been so perfected that it has replaced all other fuels, save in those localities where some natural advantage is greatly in favour of gas or oil.

The general underlying principle which has been found essential to the successful burning of pulverised coal is that to completely burn the fixed carbons the combustion must be completed while the coal is in suspension in the air. This condition necessitates a careful preparation of the coal as regards fineness, the usual practice being to grind to 95 per cent. past 100 mesh and 80 to 85 per cent. past 200 mesh.

The fineness plays such an important part in the combustion of the coal that to some extent poor coal may be successfully used if additional care be taken with the grinding.

It is found necessary, in order to make this fine grinding possible and to insure perfect combustion in the kiln, that the coal be dried so that it does not contain over ½ per cent. moisture. Considerably less power is required to pulverise the coal when it has been properly dried. The cost of drying, grinding, and conveying the coal in the United States varies between 1s. 3d. and 3s. per ton of 2,000 lbs., or about ¾d. to 2d. per barrel of cement burned. Drying is accomplished in a rotary dryer, of which there are various types, by far the most extensively used being the Ruggles-Coles double drum-dryer.

The types of mills most commonly used for coal-pulverising are the tube mill, preceded by some preliminary grinder—the Fuller Lehigh mill, or similar type of mill, and the aero pulveriser, the latter also taking the place of the fan for injection. Of the three types, the last shows a much larger horse-power per ton than either of the others. The Fuller Lehigh mill is quite an efficient grinder of coal, and it and the tube mill are the most largely used.

Great care must be taken in the coal mill to prevent sufficient air from entering the pulverised coal to suspend it until it is actually at the point of delivery to the kiln. Pulverised coal burns slowly when in a state of repose, but is highly explosive when in suspension in air, and a clean, well-ventilated mill is essential. The coal should be ground only as required; and in up-to-date plants, from the time it enters the mill up to the time of its delivery to the kiln, it is handled in closed conveyors and elevators, from which air is carefully excluded. Anything in the nature of air separation or conveying is, of course, impossible, and an attempt to handle the pulverised coal in this way in the early Edison plant caused a disastrous explosion.

The coal is usually injected into the kiln under a pressure of 3 to 4 ozs. of air, the blast only supplying about one-fourth of the air required for combustion. The remainder is drawn into the kiln through the base of the firing-hood, having passed over the hot clinker in the cooler, and enters the kiln at about 300° F.

Injection.—The principle of the pulverised coal-burner is the feeding of the coal into a blast of air issuing at a high velocity from a nozzle, and its conveyance by this air into the kiln, where it is ignited by heat radiated from the kiln walls. The difficulties encountered in this process are the obtaining of a perfectly uniform feed of the coal-dust, and an even distribution and suspension of it in the blast of air. These troubles may result in incomplete combustion, or an unnecessary amount of excess air and back flashes.

In the latest types of coal feeder the distribution is greatly improved by causing the coal to pass over a perforated plate, or through a small screen, after leaving the screw conveying it from the bin, instead of falling straight from the end of the screw into the air jet, the length of this screen and size of perforations being so adjusted that the coal-dust just reaches the end of the screen for the maximum capacity of the feeder. Even this construction does not entirely prevent the tendency of the injection to take the form of puffs, and in some recent feeders the single screw has been replaced by two screws feeding on to two air jets, which discharge into a common blast pipe. By this means a much more even feed of the coal is obtained than was previously possible with the single screw.

In some types of blast arrangement a pipe leading from the pit under the discharge end of the kiln conveys hot air to an enlarged section of the blast pipe immediately in front of the firing hood, where it is drawn in by the blast. It is questionable whether much benefit is derived from this construction, though the plant using it claims to effect a slight economy by its means.

GRINDING.

The constantly increasing demand for a finer and more uniform product from the cement plant has necessitated careful consideration as to the means of attaining this result without an addition to the number of grinding units, or an increase in the horse-power hours per barrel of cement. The changes which this has brought about have affected equally the raw grinding and clinker grinding departments of the mill. The raw grinding department has to grind 600 lb. of raw material per barrel (380 lb.) of cement, or half as much again as the clinker grinding department, but this is compensated for by the extra difficulty of grinding the hard clinker, so that most plants at the present time favour making the raw grinding and clinker grinding departments identical as to the type, size, and number of units. This obviates the necessity of stocking a large variety of spare parts, an advantage that increases with the distance the plant is located from factories where such spares may be obtained.

In order that the ever-increasing fineness of product demanded may be obtained without loss of capacity, two principles are now recognised as essential. The grinding unit must be supplied with a very uniformly sized feed, and must not be made to act both as a coarse and fine grinder. In other words, the grinding should be accomplished in stages with some means of screening introduced between the stages. In the early types of ball mill or Kominutor this screening was performed within the mill itself by means of perforated breast-plates or other type of screen, these machines as well as other grinders having internal screens, having been originally intended to accomplish the entire process of reduction in one stage. The results expected from this type of grinder have not, however, been as satisfactory as was anticipated, either as regards crushing efficiency or cost of upkeep, and this becomes more apparent as the fineness requirements become more exacting.

The combination of machines used to accomplish stage grinding varies somewhat with the types of grinder used, though as a final grinding unit the tube mill or combination tube mill is gradually replacing all other types of machines, being preceded in many installations by a ball tube mill having breast-plates or stepped linings of some kind, but no internal screens, the screening being accomplished, as was mentioned previously, by separate screens outside the grinding mill.

The development of the tube mill itself is now receiving much attention, and a most important advance is marked by its sub-division into two compartments, one being loaded with the usual pebbles, the other, known as a "ball-peb" or "cyl-peb" compartment, being loaded with smaller and heavier grinding bodies. This type of combination mill should not be confused with an earlier attempt to combine the ball mill and tube mill, which virtually amounted to joining the ball mill on to the feed end of the tube mill. The tube mill with "ball-peb" compartment may be described as follows:—

About 5 ft. from the discharge end of the mill a partition divides the mill into two compartments, the smaller of which is loaded about one-third full with small metallic bodies. These vary from plain mild steel cylinders about ½ in. diameter and ¾ in. long, chopped from round bars, to balls of special composition (generally white iron), about ⅞ in. diameter. The addition of this compartment increases the capacity of the tube mill, over a plain tube mill of the same length, by from 50 to 100 per cent. on raw material, and from 35 to 50 per cent. on clinker, with an increase in the power required to drive the mill of from 20 to 25 per cent. In addition to this, there is an increase in the fineness of the product, more especially the 180-mesh material. The amount of material passing the 90-mesh screen cannot always be increased, except at the expense of the otherwise increased capacity, but the amount of material passing the finer screen is increased. In other words, the material that passes the 90-mesh screen, and is retained on the 180-mesh screen, is reduced.

The reason for the marked improvement in the operation of tube mills due to this development seems to be as follows:—In the standard tube mill, 22 ft. long, it is found from sampling material in the mill, for every foot of its length, that there is an almost constant increase in the fineness of the material, or the percentage passing 90- and 180-mesh, from the feed-end to a point about 16 ft. away from the feed-end. After passing this point the increase in fineness falls off rapidly, showing that the pebbles in the tube mill are more especially adapted to the coarser work done, and at the discharge end of the mill, where the finishing of the material takes place, there are not enough pebbles to do it.

The "ball-pebs" each weigh about the same as a pebble, and, being so much smaller, increase the number of contact points, or the effective grinding area, to two and a-half or three times what it would be in the case of pebbles. They are, therefore, admirably adapted to finishing the grinding of the fine material, and will finish a great deal more in proportion to the space they occupy than would pebbles.

Furthermore, the material flows through the tube mill under a head much like water, entering at the centre of the feed-end and leaving at the periphery of the discharge-end. With the partition the effective head for the flow of the material is doubled.

The wear on the pebbles in this type of mill has been found to be reduced, while the wear on the ball-pebs is so slight as to be almost unnoticeable. At the present time most of those plants using tube mills are having them converted by the addition of a "ball-peb" compartment, while "ball-peb" tube mills are almost exclusively demanded for new installations.

SCREENING.

In plants where outside screens are used between the coarse and fine grinding mills, the most common type found is the "Newaygo" vibrating screen. This is an inclined wire cloth screen in which the wire cloth is maintained at a uniform tension by means of springs, and is struck by small mechanically-operated hammers. A scalping screen of coarser mesh is placed above the fine screen, and serves to relieve it of wear from the larger particles and increase its capacity. These screens are exceedingly efficient on all dry materials such as are found in the cement plant, and show very low costs

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for operating and maintaining, even on Portland cement clinker—certainly less than one-tenth of a penny per barrel. The largest size consumes less than one horse-power. One cement plant alone—the Universal Portland Cement Co.—operating on blast furnace slag and limestone, uses forty-six of these screens.

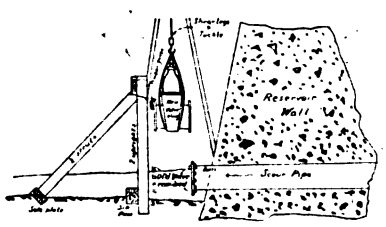
Air separation on the final grinding mills in the clinker department, though not heretofore used to a great extent in plants in the United States, is now being introduced by many, and seems, without doubt, to insure a finer product from the clinker mills.

FIXING A SCOUR VALVE IN A RESERVOIR WALL AGAINST PRESSURE.*

By F. C. KENDALL, Water Supply and Sewerage Branch.

The renewal or repair of a scour valve in a reservoir wall must always involve considerable care. After these valves, generally ordinary screw-down stop-valves, are built in, they are often neglected or are not worked sufficiently, with the result that grit accumulates and hardens in the working parts and the valve spindle refuses to turn.

This was found to be the case with the Katoomba storage reservoir. The wall, a curved one, 21 ft. high, had recently been raised a further 25 ft. to increase the storage, and during this work it was necessary to keep the water level near its original height, so that it should not rise too quickly against the new concrete. Naturally, an attempt was made to open the scour valve, in this case a



12-inch stop-valve, but the spindle refused to move. Under repeated efforts it broke, and was found to be bent as if at some time it had been turned in the wrong direction. Another spindle was obtained, and inserted through the nut. This time when the key was applied the spindle was turned a few threads, when the cast-iron lug holding the nut snapped, and the whole valve became unworkable. This catastrophe was due to no unusual strain, but simply to the cementation of the valve faces against the guides owing to long disuse.

A new valve was at once obtained with a flanged connection bored to suit the flanged end of scour pipe.

At this stage the question arose whether an iron plate or weighted wooden disc should not be lowered on the water side of wall to be drawn in against the water end of the scour pipe and so close the pipe, and shut the water off during the process of fixing the new valve. There was, however, the objection that soundings showed, or appeared to show, a considerable depth of silt over the pipe. It might be held that this silt would have been rapidly cleared from the end of the pipe with the first rush of water, but this seemed doubtful, and certainly a great deal of water would have been lost, a consideration which was not to me minimised.

There seemed, on the other hand, to be no adequate reason why the valve should not be fixed against the pressure, or, rather, in a manner to evade the pressure. The following method was adopted:—

Over the site of the valve a sheer-leg tackle was erected, and the new casting was slung directly over its intended position. In view of the great water force to be resisted, a vertical frame of timber was erected at a distance from the flange of the scour-pipe, about 2 in. in excess of the length of valve casting. This frame consisted of two vertical uprights 6 in. by 6 in. oregon, bottomed and fixed securely against a sill-piece which was well-anchored into the banks of scour drain. The uprights were tied at the top by a heavy crosspiece of oregon. Strong struts were placed at the back or downstream side of the frame, and butted against a firm sole plate. The whole arrangement is shown on the accompanying sketch.

The bolts in the flange of the old valve nearest to the wall were then unscrewed and drawn back flush with the scour-pipe flange to be ready to insert in the new valve at the proper moment. A gang then quickly pulled away the old valve.

The water now rushed out under full bore with 26 ft. of head. The new valve was then lowered by the tackle. It should be mentioned that it had a crosspiece of smooth timber, bolted transversely to the flange at the outlet end. As the valve descended the water impinging upon it drove it hard against the framework, down the uprights of which the crosspiece of timber just alluded to slid down, acting as guide. The valve in the casting was open, so that the water-jet soon rushed almost wholly through the casting and the heavy pressure was at once relieved. After very little trouble the bolt holes in the valve flange were brought opposite the corresponding ones in the scour-pipe flange, when the bolts already in position were driven through and the flange packed and secured. After this the valve was closed and the operation completed, the water being once again under full control.

* From the Sydney (N.S.W.) Government Report of the Department of Public Works.

LEGAL INTELLIGENCE.

MINISTRY OF MUNITIONS SUPREME.—In the Court of Appeal on Monday the Master of the Rolls and Lords Justices Warrington and Scrutton gave judgment for Dick Kerr and Co., Limited, in the action brought against them by the Metropolitan Water Board. Defendants had contracted to build a reservoir at Littleton (Middlesex) for £673,000, under a contract. On February 21, 1916, the Minister of Munitions ordered the defendants to cease work upon the reservoir and to hold their plant and labour at the disposal of the Minister. By direction of the Minister the defendants removed a considerable portion of the plant and sold it to the owners of munition factories and received the proceeds, to the amount of £42,000, on behalf of the Minister. Defendants contended that by reason of the stoppage of the works by the order of the Minister their contract with the plaintiffs was terminated, and that the property in the plant was revested in them. Plaintiffs then brought the present action for a declaration that the contract was still binding. Mr. Justice Bray held that the object of the contract was not frustrated, and that the plant was the property of the plaintiffs, but that as the Minister of Munitions had power to sell the munition factories any plant which he removed, therefore the plaintiffs were not entitled to the proceeds of so much as was sold or to damages for its conversion. His lordship granted an injunction restraining the defendants from removing any further plant except so far as they might be ordered to do so by the Minister of Munitions.—Their lordships held that in the events that had happened the contract was dissolved, and made a declaration to that effect and discharged the injunction restraining the defendants from removing the plant remaining on the site.—Lord Justice Scrutton said that as the result of the judgment of the Court other questions might arise between the parties as to payment for work done, etc., which must be determined by another action, the Court not having the material to deal with those questions.—The appeal was accordingly allowed, with costs.

TRADE NOTES.

Boyle's latest patent "air-pump" ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, E.C., have been employed at the Engineers' Conference Room, London and North-Western Railway, Euston Station.

There are two methods of constructing houses with dry external walls. One is to form a cavity in the wall, and the other system is to build a solid wall and then render it with waterproofed cement. It has been proved in practice that the latter, in addition to being the surer way, is also the more economical. In a recent town-planning scheme at Bradford, Yorks, the houses were built with solid walls and roughcasted with Pudlocd cement, and the result has proved satisfactory.

Building Intelligence.

MONAGHAN.—The work in connection with the County Monaghan Sanatorium has now been completed. Mr. J. J. Hanningan, B.E., county surveyor for Monaghan, supplied the drawings and specifications, etc., and the work has been carried out under his personal supervision. The outlay amounted to over £1,000. The front measures 50 ft., and the wing is 50 ft. in depth. On the ground story are situate the doctors' room and surgery, etc., reception room, large dining-room, with a large ward and a smaller ditto, in addition to large kitchen, pantries, scullery, servants' rooms, etc. The upper portion contains three spacious wards, matron's and nurses' apartments, etc. The work was carried out in separate contracts, mostly by local firms.

PROFESSIONAL AND TRADE SOCIETIES.

ARCHITECTURAL SOCIETY OF IRELAND.—Last week, at a meeting of the members of the Architectural Society of Ireland, held in their rooms in South Frederick Lane, Mr. H. G. Leask (President) in the chair, Mr. M. J. Burke, F.S.I., read a paper on "Modern Heating Methods." In his paper, which was mainly of a technical nature, Mr. Burke explained the principles and considerations which governed present-day methods of heating large buildings by means of hot water, and also the various systems of steam heating. The lecturer dealt with some of the more generally accepted theories on the subject, illustrating his observations by diagrams and views of portions of heating plant in actual use. On the motion of Mr. B. Howard Pentland, F.R.I.B.A., a vote of thanks was passed to the lecturer.

FACULTY OF SURVEYORS OF SCOTLAND.—The fourth annual general meeting was held in the Christian Institute, Glasgow, last week. The annual report and accounts of the General Council and the Examining Board were adopted. The resignation from membership of Messrs. John G. Aitchison, John Clachan, and Alexander Davie were accepted. The following were elected office-bearers for 1917:—President, Mr. Thomas Fairbairn, 53, Queen Street, Edinburgh; vice-president, Mr. John Murray, 16, Blythswood Square, Glasgow; secretary and treasurer, Mr. D. E. Wallace, C.A., 59, George Street, Edinburgh.

NOTTINGHAM AND DERBY ARCHITECTURAL SOCIETY.—To afford members an opportunity of social intercourse the society's room was opened on Tuesday afternoon, February 6. After tea, a general meeting was held, at which the President (Mr. H. Gill, M.S.A.) took the chair. Mr. A. E. Lambert was elected a member. Mr. Bromley (past-President) announced that Mrs. Arthur Marshall had sent him a selection of her late husband's pencil sketches and sketch-books to present to the society. The President then addressed the meeting upon Uniformity of Practice." He said:—"The council have had under consideration the important matter of 'Uniformity of Practice,' but so far no definite conclusion has been arrived at. They were asked to compile a set of model conditions, but find it impossible in the present state of things to frame any set of conditions which will apply in all circumstances without imposing intolerable burdens on the profession. Whenever trouble arises we are told it should have been put in the preamble of the bill of quantities. The preamble is already too voluminous, and a 'slim' contractor will wriggle out of it even if were made as long again. We must find a way that will make our labours cheaper and not dearer, or we shall have more cases of owners going direct to the builder for help. After much thought, I feel satisfied in my own mind that we must find a better way. We must create such '*unanimity* of practice' that no room for two opinions on vital points are possible, and thus make an unwritten code more powerful and binding than any number of clauses, and I am decidedly of opinion that we should leave the purely legal clauses out of the specification and embody them in the form of con-

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tract. But I am equally satisfied that to do this we must cultivate more friendly relations not only with the contractor, but also with the operative. I know some architects will think this is derogatory to the profession, but I do not think it is so derogatory as some of the clauses now in use. We must cultivate friendly relations, but in such a way as to avoid any suspicion of that ugly word "collusion," for I do not hesitate to say that some architects have done untold harm to the profession by collusion with the builders. We must also show the public that, while interested in our work as practical men familiar with the way the work should be done, we are yet disinterested in any other sense than the production of good, honest, artistic work. There must also be more cohesion among the members of the profession. . . ."

OLD PEWTER.—At a meeting of the British Archæological Association held last Thursday, Mr. Francis Weston read a paper on "Old Pewter Plate," illustrated by English and Scottish specimens and a dish bought in the market-place of Ghent by the Bishop of Barking. He explained how Edward III. became the patron of the pewterers' craft when he created the Dukedom of Cornwall for the Black Prince and opened the long dormant mines, which, with the pewterer at hand, provided a revenue for the King's son. From that time forward the craft flourished. The Civil Wars, however, wrought havoc with specimens of the art, for while the silver plate was melted down for money, the pewter plates were turned into bullets, and the Great Fire of London helped the clearance. Specimens of the sixteenth and seventeenth centuries were of the utmost rarity.

Our Office Table.

At a meeting of the South Carolina Chapter of the American Institute of Architects, held in Charleston, on January 10, a resolution was passed authorising the Legislative Committee of the Chapter to endorse the passage of a Bill in the present Legislature "to define the qualifications for the practice of architecture in the State of South Carolina, and to provide for the examination and registration of architects."

Mr. George Gilbert Scott appealed at the Law Society Appeal Tribunal last Wednesday for Mr. A. G. Crimp, Lic.R.I.B.A., his office manager, thirty-seven, A1.—Counsel stated that Mr. Scott was patriotically giving his valuable time and services in designing the plans and elevations for the Star and Garter Home for Incurable Soldiers at Richmond. While he was performing this highly important national work Mr. Crimp, who was a qualified architect, was the only man on whom Mr. Scott could rely to manage his office affairs.—Mr. Scott said that during the last three weeks the Committee of the Home had asked for drastic alterations in the plans, involving an entirely new set of plans. They had agreed also to increase the cost from £120,000 or £130,000, as originally intended, to £200,000.—Three months' exemption was granted.

The increased demand for systematic inspection of meat exposed for sale, and of the flesh of all cattle at the time of slaughter, called for better facilities to make such inspection practicable, writes Dr. Hall, the Medical Officer of Health for Plymouth, in his annual report. Experience indicated that neither the public health nor the sale of diseased flesh could be efficiently guarded except by a system of public abattoirs, which he hoped would receive the serious consideration of the council at an early date. If a public abattoir were once established he felt sure the advantages would be so manifest that the private slaughter-house would soon be voluntarily abolished, the inspection of meat would be facilitated, cleanliness assured, slaughtering centralised, and the process carried out with greater humanity.

The Artists Rifles, which is furnishing the New Army with so many officers, is pushing along the co-operative movement, of which a preliminary account was given in these columns some months ago. The main idea is to organise a regimental bureau where members may register themselves for employment after the war. As the corps contains young men of almost every vocation and status in life, some will want workers while others want work. The Bureau will bring them together, and will no doubt lead to many schemes by which both officers and their men may be associated in the development of the British Empire when peace returns. The rooms taken by the corps in Craven Street are rapidly developing into an excellent regimental club.

The sixty-eighth annual report of the Prudential Assurance Company, Limited, for the year ending December 31, 1916, states that in the ordinary branch the number of policies issued during the year was 46,258, assuring the sum of £5,080,989, and producing a new annual premium income of £373,309. The premiums received during the year were £5,230,170, being an increase of £72,654 over the year 1915. The claims of the year amounted to £4,573,917, of which £249,689 was in respect of war claims. The number of deaths was 12,407. The number of endowment assurances matured was 27,065, the annual premium income of which was £146,894. The number of policies including annuities in force at the end of the year was 932,539. In the industrial branch the premiums received during the year were £8,897,723, being an increase of £391,660. The claims of the year amounted to £4,005,251, of which £827,879 was in respect of 49,625 war claims. The bonus additions included in the claims amounted to £112,565. The total number of claims and surrenders, including 16,741 endowment assurances matured, was 598,917. The total number of policies in force in this branch at the end of the year was 21,305,330; their average duration exceeds thirteen and a quarter years. The war claims paid during the year, in both branches, number 52,433 and amount to £1,077,568. The total paid up to the present on this account since the outbreak of war exceeds £1,860,000, in respect of over 88,000 claims. The assets of the company, in all branches, as shown in the balance-sheet, are £99,123,746, being an increase of £4,328,948 over those of 1915.

When the first Marquis of Westminster paid £30,000 for the Five Fields, Pimlico, he was held to have given an exorbitant price, the land having been in the market for some time. It was offered to the Crown, and, being near Buckingham Palace, the offer would have been accepted had the vendor consented to take a lower sum for what was then justly described as "little better than a vast swamp." Within twenty years of its incorporation in the Grosvenor estate the swamp had been transformed into one of the most fashionable quarters of London, thanks to the ingenuity of Thomas Cubitt, whose son, Lord Ashcombe, has just died. Cubitt devised a plan for removing the clay which formed the first strata and burning it into bricks, and then building on the substratum of gravel. Belgravia is, therefore, one of the healthiest spots in London, although it lies so low that the attics in Eaton and Belgrave Squares are on the same level as the ground-floor of some of the terraces on the north side of Hyde Park—that is 70 ft. above the Thames high-water mark.

At a two days' conference last Thursday and Friday on town-planning and housing at Newcastle-on-Tyne, Councillor David Adams said that since the war there had been an astounding and alarming shortage of housing. If they could instantaneously build 700,000 up-to-date working-class dwellings they would only begin to deal with the problem. After that they must erect something like 100,000 houses each year to provide for the rising generation and the normal increase of population. The administrative sections of the community had shown an amazing antipathy to housing, and had been behind legislation. Unemployment was a direct cause of bad housing conditions. Approximately they spent £35,000 a year in Newcastle for the maintenance of the public health, and, if they had ideal conditions, which were not impossible, that amount would be reduced to a small sum. If dealt with on national lines, the housing problem would be solved. The solution of the extraordinary shortage of houses would not merely be a municipal one, and not merely private and speculative; it would be a combination as suited to different districts in the country. Mr. F. G. Lundi said that two of the drawbacks to building were the competition of municipalities and the price of money, which could not be got at less than 5 per cent.

Preliminary arrangements in connection with the permanent exhibition of Irish materials and products used in the construction and decoration of buildings, which the Department of Technical Education and Agriculture, acting in co-operation with the joint committee of the Royal Institute of the Architects of Ireland and the Dublin Industrial Development Association, are promoting, are already well advanced under the direction of Mr. E. St. John Lyburn, of the Department. Suitable space has been secured in the Science and Art Museum, Dublin, and the exhibits will be displayed at an early date. The offices of the joint committee are at 9, Dawson Street, in the rooms of the Dublin Industrial Development Association, and they will be glad to afford information to anyone interested.

Since reinforced concrete was introduced it has been usual to employ plain round mild-steel bars, but Mr. Arthur W. C. Shelf, in a paper on "High Tensile *versus* Mild Steel for Reinforced Concrete," read before the Society of Engineers at Burlington House, Piccadilly, W., on Monday contended "that plain mild-steel bars are not the best to employ for this purpose, but that greater efficiency and economy are obtained by physically developing mild-steel bars, for the purpose of taking out the first yield in the steel, which is useless and has a detrimental effect." Mr. Shelf argued that when this first yield or stretch is taken out, a higher yield point is obtained without any injury to the steel, so that it is then safer to employ a 20,000-lb. stress to the square inch (which results in a saving of 20 per cent. in weight of steel required) than it is to employ a 16,000-lb. stress to the square inch before the steel is physically developed, and for this reason he considers that the existing regulation of the London County Council relating to the stress on steel should be altered, and thus avoid the cramping of industrial progress.

At a meeting of the London Society last Friday at the Royal Society of Arts, Mr. Walter H. Godfrey gave a lecture on Chelsea, illustrated by lantern slides. He declared that it was Sir Thomas More who might be said to have discovered Chelsea, for it was he who drew fame to the place. Slides were shown depicting Sir Thomas More's home, the Old Church (St. Luke's), the riverside with its early houses and their occupants, the Physic Garden, which was originally the botanic gardens of the Apothecaries' Company, and still thrives; the Royal Hospital, Paradise Row, Cheyne Walk, King's Road, and other places in the "Village of Chelsea," where so many famous people of the past resided. In a brief discussion which followed, General Sir Neville Lyttelton (Governor of the Royal Hospital) mentioned that in the Great Hall could be seen a good picture by Vandyke. It came into the possession of Colonel Ireton, Cromwell's son-in-law, and was sold by him to the Governors of Chelsea Hospital for £45. Carlyle, writing to his friend Sterling about a year or two before his death, said that, although he had been living in Chelsea for 40 years, and passing the Hospital many times a week, it was only recently that he discovered it.

Lieut.-Colonel Blackwall, county surveyor for Cambs, has been appointed by the King to be a member of the Distinguished Service Order.

The Hibernian Bank will rebuild on the site of their destroyed premises in Lower Sackville Street, Dublin, and the Munster and Leinster Bank have acquired a site at the opposite corner of Abbey Street. Messrs. W. H. Byrne and Son are the architects for the former building, and Mr. L. A. MacDonnell for the latter.

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TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

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NOTICE TO OUR READERS.

Solely to economise paper, the price of this journal will be raised next week to *Sixpence*, and thereafter, until the war is over, or till the present scarcity and high price of paper ceases.

If, as at present seems but too probable, further restrictions as to supply are forced upon us, we shall have to diminish its size, but we are loth to do this while enough paper is obtainable, even at loss to ourselves.

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P. S.—No.

ALIAS.—Yes; see our note on the subject last week.

A. L. CURRIE.—Write B. T. Batsford, Ltd., 94, High Holborn, W.C. They stock several books on the subject.

F. M.—We fear the answer is Yes to both questions. But the second point is worth disputing, and probably will be disputed by somebody.

M. J. T.—We cannot possibly advise on the facts (?). Unless you have very strong corroborative evidence thereof we think litigation would be ill-advised.

Mr. Louis Conatad, builders' merchant, late of 48, Bushill Park, Enfield, has left £125,402.

The death occurred at St. Leonards last Friday of Mr. James Forrest, who was honorary secretary and for many years secretary of the Institution of Civil Engineers. He was born in Westminster in 1825.

TO ARMS!

1st LONDON ENGINEER VOLUNTEERS.

Headquarters, Balderton Street, Oxford Street, W.

ORDERS FOR THE WEEK, BY LIEUT.-COL. C. B. CLAY, V.D., COMMANDING.

OFFICER FOR THE WEEK.—Platoon Commander E. Greenop.

NEXT FOR DUTY.—Platoon Commander H. de P. Birkett.

RESIGNATIONS.—Platoon Commanders G. H. Parker and J. O. Cheadle resign their appointments on joining the Army.

MONDAY, March 12.—Technical for Platoon No. 9 at Regency Street. Squad and Platoon Drill, Platoon No. 10. Signalling Class. Recruits' Drill, 6.22—8.

WEDNESDAY, March 14.—Instructional Class, 6.15. Platoon Drill, Platoon No. 2.

THURSDAY, March 15.—Platoon Drill, Platoon No. 5 and 6. Ambulance Class by M.O., 6.30.

FRIDAY, March 16.—Technical for Platoon No. 10, Regency Street. Squad and Platoon Drill No. 9. Signalling Class. Recruits' Drill, 6.25—8.25.

SATURDAY, March 17.—Commandant's Parade, 2.45. Uniform, for Route March. Bugles and Drums to attend.

SUNDAY, March 18.—Special Work at Bombing School. Parade, Clapham Junction Station (City and S.L. Tube Railway), 9.45 a.m. Uniform, haversacks, water-bottles. Midday rations to be carried.

EASTER TRAINING.—Will be at Esher. See Special Order.

MUSKETRY.—For all Companies, see Notice at Headquarters.

NOTE.—Unless otherwise indicated, all Drills will take place at Headquarters.

By order,
MACLEOD YEARSLEY, Adjutant.

March 9, 1917.

The death has occurred, at Aberdeen, of Mr. David T. Byres, architect and civil engineer, who had been, until laid aside by illness some time ago, for many years a member of the burgh surveyor's staff.

The Gas Light and Coke Company have given notice that, in consequence of the increased cost of labour, freights, coal, oil, etc., they are compelled to advance the price of gas in their district north of the Thames from 3s. to 3s. 4d. per 1,000 cubic feet, as from the reading of the meters in March.

The *Manchester Guardian* hears a very interesting rumour of the possibility of Lord Crewe becoming this year chairman of the London County Council. He is not a member of the body, but could either be co-opted or enter through an aldermanship. His father-in-law, Lord Rosebery, was the first chairman of the L.C.C.

A manufacturing company in Melbourne has received an order from an engineering firm at Hankow for quantities of Australian marble. Marble is found in China, but the firm states that it cannot get so satisfactory a polish from the local production, and that, therefore, it prefers the Australian commodity to English, Japanese, and European samples.

In connection with the Spenborough Water arbitration case and the Bradford City Council, the cost of deputations to London, it was stated at the last meeting of the Bradford City Council, amounted to £249 10s. 2d. Most of the members, it was elicited, travelled first-class, and they were accused of being extravagant. It was stated that the arbitration will be taken to the High Court. One Alderman, not satisfied with the explanation given, remarked: "It seems to me we ought to set up an office in London, and take a hotel for the Water Committee!"

LIST OF TENDERS OPEN.

BUILDINGS.

March 14.—Construction of Pumping Station Buildings, Chimney Shaft, Approach Road, and other works at Sheerness East.—For the Sheerness Urban District Council, in accordance with plans and specifications prepared by F. W. S. Stanton, the council's consulting engineer.—V. H. Stallon, Clerk, Council Offices, Sheerness.

No date.—Ordinary Works and Repairs to the buildings in the charge of the Commissioners of H.M. Works in the London districts (One Year).—Tenders to be delivered, on a date to be announced, to the Secretary, H.M. Office of Works, Storey's Gate, London, S.W.

ENGINEERING.

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

FENCES AND WALLS.

March 30.—Wrought-iron Gates and Fencing, for the Central Wharf and Quay Street Landing, Auckland, N.Z.—For the Harbour Board.—The Commercial Intelligence Department, 73, Basinghall Street, E.C.

PAINTING.

March 14.—Internal and External Painting, etc., and Internal and External Repairs at Callington police-station.—For the Cornwall County Council (Standing Joint Committee).—L. D. Thompson, County Surveyor, County Hall, Truro.

ROADS AND STREETS.

March 8.—Road Material, Stores, and Carting (One Year).—For the Tadmaster Rural District Council.—T. Scott, Surveyor, Aberford, Leeds.

March 10.—Supplying Materials, Stores, Steam-rolling and Tractor Hire (One Year).—For the Durham County Council.—A. E. Brookes, County Surveyor, Shire Hall, Durham.

March 10.—Bricks, Vitrified Tiles, Land Drain Tiles, etc., Road Materials, Granite, Limestone, Slag, Kerbs, Channels, Flags, Lump and Broken Stone, Tarred Granite, Macadam, etc. (One Year).—For the Southport Corporation.—A. E. Jackson, A.M.I.C.E., Borough Engineer and Surveyor, Town Hall, Southport.

March 10.—Materials (One Year).—For the Buxton Town Council.—Borough Engineer's Office, Buxton.

March 12.—About 2,500 tons of Road Stone.—For the Leamington Corporation.—L. Rawlinson, Town Clerk, Town Hall, Leamington Spa.

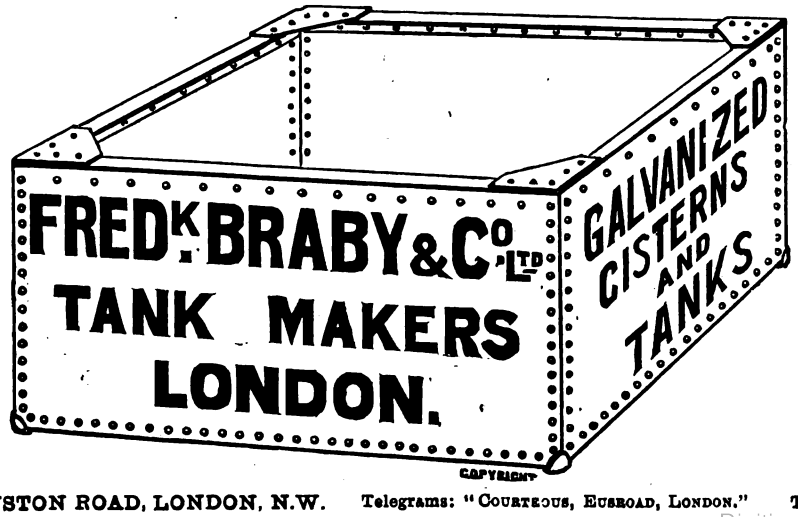
March 12—17.—Supply and delivery of best quality surface Field Flint, Pit Gravel, Fine Gravel, and Binding Gravel.—For the West Hampnett Rural District Council.—W. D. Rasell, Clerk, 5, South Street, Chichester.

March 13.—Supplying Broken Furnace Slag, Broken Granite, Machine and Paraffin Oils, Castings, Bricks, Cement, Coal, Disinfectants, Stoneware Pipes, etc. (One Year).—For the Walsall Rural District Council.—W. P. Young, District Surveyor, Council Offices, Daw End, Rushall, Walsall.

March 13.—Whinstone, Granite, Annealed and Ironstone Slag, Tarred Slag and prepared spraying Tar (One Year).—For the Knaresborough Rural District Council.—J. Smith, Clerk, Rural District Council Offices, Knaresborough.

March 14.—Clean hand-picked Field Flints, to be delivered on roads in district during the spring and summer, and general carting and haulage of road materials.—For the Aylesbury Rural District Council.—H. G. Gordon, Highway Surveyor, 21, Walton Street, Aylesbury.

March 14.—Materials for maintenance of highways (One Year).—For the Aylesbury Rural District Council.—H. G. Gordon, Highway Surveyor, 21, Walton Street, Aylesbury.



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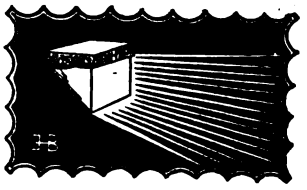

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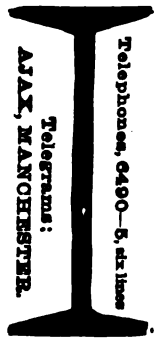

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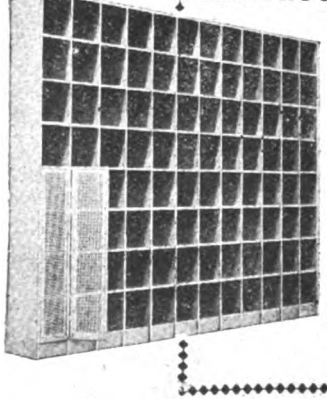

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March 14, 1917. Volume CXII.—No. 3245.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.2.

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OUR ILLUSTRATIONS.

New East Window, Prestbury Church, Cheshire. "The Crucifixion" and "Tree of Life." Designed and executed by Mr. Archibald K. Nicholson.

The Ruined Cathedral of St. Martin, near the demolished Cloth Hall, Ypres. (Royal Academy Exhibition of Graphic Art.) From an etching by Mr. Frederick Marriott, A.R.E.

Staircase, the Reader's House, Ludlow, Shropshire. (Royal Academy Winter Exhibition of Graphic Art.) From a lithograph by Miss Bessie M. Dibblee.

Residence, Yardley Wood, Birmingham. View and plans. Mr. Horace G. Bradley, Architect.

A Pair of Old Walnut Cabinets ("William and Mary" and Italian). Also Pair of High-back Upholstered Chippendale Chairs, embroidered with Petit Point Needlework. Sold by Messrs. Knight, Frank, and Rutley, at 2, Porchester Gate, W.

Currente Calamo.

Many times has Bagdad changed hands since El Mansur built it and made it the seat of the great Saracen Empire about 762. Mongol, and Tartar, and Persian have held it, and it was not till 1638 that the Turk captured it, putting nearly the whole of its inhabitants to the sword. It must never change owners again now that British and Indian valour have frustrated Germany's scheme for the establishment of a great Asian Empire. There is no vestige of the glories of the capital of Haroun Alraschid. The city is mean and ugly, and built of brick. But few cities in Asia are of greater importance, standing as it does at the junction of the four great highways to Aleppo, the Persian Gulf, Ispahan, Hamadan, and Mecca. There is work ready at once for British engineers and builders, for by railway Bagdad must be brought into close communication with India, and made the great key to the establishment of closer trade relations with Europe. German engineers are busy on projects for improving their end of the Bagdad Railway. It is reported that, with a view of obviating the necessity of a ferry across the Bosporus, they are concerting plans for tunnelling under the Bosphorus, while another scheme contemplates the construction of a bridge 660 yards long over the Bosporus from Rumeli-Hissar to Anatoli-Hissar. At present there is, it is believed, a gap of some 250 miles at the other end, between Nisibin, the present railhead of the line, and Bagdad. The completion must never be left to Germany, unless once again our Foreign Office is to be allowed to shut its eyes to future certainties. For, as sure as the Germans will not stop short of Basra, unless we hinder them now and for ever, so surely will they be a week nearer India, when they are ready for "the next war" they already threaten.

Bagdad stands amid the ruins of more extinct capitals than lay within an equal circumference in any other quarter of the earth. Twelve miles above it stood Babylon; still closer to it but lower down the Tigris were, on opposite banks, the Syrian capital, Seleucia, and the Parthian capital, Ctesiphon. When Abou Jaffir El Mansur, the first of the Abbaside Caliphs, founded Bagdad, in 762-3 A.D., he utilised the bricks and stones left of those famous but fallen cities to build his own. El Mansur's city was on the right bank of the Tigris, and he named it Medinet es Salaam—the City of Peace. The name is also given in the form of Dar es Salaam, which means the same thing; and the Byzantine historians translated it into the euphonic title of Irenopolis. At a distance crenellated walls, bastioned gates, numerous towers, a wide ditch, a lofty citadel, and a noble river flowing between opposing ramparts gave the city an aspect rare among the habitations of men. Above the walls appear the gilded domes of mosques and royal tombs alternating with dainty minarets and cupolas. But of the Bagdad of Haroun there alone remains the tomb of his favourite wife Zobeida, erected, not in the new city he founded, but in the older town on the right bank. More modern, but still of respectable age, is the old Madressa, or college, of the thirteenth century, which while it flourished made Bagdad the chief centre of Arabic learning. But the Madressa has been turned to more material uses, and now serves as the Custom House.

Manchester was made the richer last week by the most generous gift of the collection of pictures which the late Mr. J. T. Blair has bequeathed to his native city. The reproach that comes with it, as the *Manchester Guardian* remarks, arises from the unpleasant reflection that Manchester has not a fitting art gallery where the new gift can be permanently and adequately displayed. By a rearrangement of the Mosley Street gallery Mr. Blair's complete collection could be displayed for some time as a sort of temporary exhibition. After that it would presumably have to take its chance with the rest of the art treasures which Manchester owns, but to which Manchester declines to give a worthy and comprehensive dwelling. It is scarcely an encouragement to other private owners who might be inclined to give Manchester the benefit of their generosity. A tram-centre on the old Infirmary site would doubtless compensate the Manchester Philistines for everything. They, doubtless, fancy the sight of one would induce a wavering benefactor to make his gift, whether it could be housed properly or not! We are very glad that at a special meeting the Council of the Manchester Society of Architects passed a resolution stating that the Society "learns with profound regret that a Committee of the Corporation of Manchester proposes to utilise the 'old Infirmary site' as a tramway centre. It enters a strong protest against the scheme for making a tramway centre and erecting buildings on it in the manner set forth on the plan published in the report of the Special Committee on the Passenger Transportation Problem, and presses for a further consideration of the whole matter with a view to carrying out the scheme for which the Infirmary site was specially purchased." There must be some member of the Corporation who will understand why such a course of action will be disastrous every way, and there are many citizens, we are sure, who will endorse the protest of the Society. To all such we appeal to second the action taken, and save Manchester from a perfectly needless and in every way derogatory prostitution of the site which was specially purchased for a most legitimate and desirable purpose, the abandonment of which will be deplored by all who value the reputation of Manchester.

H.M. Trade Commissioner in New Zealand writes that it has been pointed out to him that British manufacturers do not make sufficient use of the description "British made" on the goods they supply. In a market such as New Zealand, where there is a keen desire to purchase British goods whenever possible, such a description would have a strong selling force. A case brought to the notice of H.M. Trade Commissioner recently was one in which a buyer in New Zealand returned a shipment of goods because he was convinced that they were of German manufacture. In view of the developments which have been made in the United Kingdom in the manufacture of goods formerly supplied by Germany, adds H.M. Trade Commissioner, this case illustrates what might easily happen in instances where goods really are British but are similar to German goods. We may add that it may just as easily happen where formerly German manufacturers change the names of their products and the style of their firms. Early recognising the wisdom of the course officially

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suggested above, Messrs. Louis Berger and Sons, Limited, of Homerton, N.E., issued in 1914 an adhesive stamp to affix one to every package of Berger goods. The remarks quoted above show that this practice should not be discontinued, and agents who find that they have in stock any Berger products not bearing this stamp prominently on the package are asked to apply to them for supplies of the stamps and to be good enough to label up their stock. It is good for British trade so to do. It would be well for other firms to follow the example.

The following appeared in some of the morning papers of Monday, and, as permission is given by the author, we add those of our readers who may not elsewhere have seen it to the millions who will welcome the stirring appeal of England's greatest novelist, who still reckons his first calling, architecture, among his "recreations":—

FOR NATIONAL SERVICE.

Up and be doing, all who have a hand
To lift, a back to bend. It must not be
In times like these that vaguely linger we
To air our vaunts and hopes; and leave our land
Untended as a wild of weeds and sand.
—Say, then, "I come!" and go, O women and men
Of palace, ploughshare, easel, counter, pen;
It will enray your names to dates unscanned.

Would years but let me stir as once I stirred
At many a dawn to take the forward track,
And with a stride plunged on to enterprise,
I now would speed like yester wind that whirred
Through breaking pines; and serve with never a slack,
So loud for promptness all around outcries!

THOMAS HARDY.

March, 1917.

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"Raise the Shutter!" is the well-conceived motto of a businesslike reminder Messrs. S. W. Francis and Co., Limited, of 64-70, Gray's Inn Road, W.C., are sending to their clients as a timely reminder of the varied uses of the many forms of shutter they have developed as the leading pioneers of the industry with which their name is inseparably associated. The leaflet excellently replaces the usual catalogue issue, and will be most useful when the boom comes after the war. Now is the time therefore to decide what alterations, improvements, or additions are desirable, so that, directly peace comes, work may be put in hand, and the first in the field will reap the benefit. Meanwhile for present necessities Messrs. Frandis and Co. show illustrations of their specially suited shutters for gun-sheds, aeroplane hangars, and the like, which they have supplied to Government in many localities. There are also other illustrations of the various advantageous adaptations of other shutters, such as the interlocking steel lath rolling shutters which the L.C.C. and the fire insurance offices accept now in lieu of the old-fashioned cumbrous wrought iron doors; the admirable space-saving protectors of book-stalls, fruit stalls, etc., on piers, railway stations, etc. To sum up, if you want rolling shutters of any description, or if you have openings which you desire to close and do not know how to do it, send Messrs. Francis and Co. particulars, and any desired information will be gladly given. Also remember that they manufacture shop fronts in brass, gun, or white metal, inside and outside spring roller sun-blinds, collapsible steel gates, glass facias, gilt wood letters, metal letters, etc., and do not fail to write them when in the market for any of these articles. Your communications will receive every attention and your requirements will be amply satisfied.

We learn that Mr. F. J. L. Robertson, the well-known secretary of Claridge's Patent Asphalte Co., Limited, has joined the R.N.V.R. The whole of the company's pre-war staff has now joined the Forces, and the directors are to be congratulated on their efforts to "carry on" under such difficulties. We wish Mr. Robertson all luck, and the company the continued prosperity it so well deserves.

"WIGWAM."

Said Sir James Crichton-Browne recently at Cardiff: "We cannot send back the brave men who fought for us abroad into hovels and dug-outs and funk-holes at home. . . . We must recognise the right of every civilised man to a clean Wigwam." Taking that pronouncement for his text, Mr. Watkin Williams has published a shilling volume embodying a key to social reform which would indeed unlock the shut door which, as we have pointed out month after month during the past seven years, blocks the way to the possession of his birthright by every worker in the realm, but which opens at a touch the road to the bankruptcy court to every man connected with the second great group of industries in the kingdom. The volume is published at a shilling by the Educational Publishing Company, Ltd., Cardiff, and can be had post free for 1s. 4d. therefrom, or from the author, Mr. Watkin Williams, Gwawrfryn, Llanishen, Cardiff. We urge every reader to send for a copy, and those who can afford it to buy half-a-dozen and distribute them to friends, and so help to bring home to the millions interested one of the most cogent pleas for justice to the unhoused, and the profit of all, ever penned.

Would it be politic, asks Mr. Williams, to tax the Mercantile Marine or the shipowners with the whole cost of the Navy? Would it be fair to saddle the farmer and the landowner with the whole cost of the Army? Is it just to tax the occupier and the owner of buildings with an overwhelming share — five-sixths — of National Services, as if there were no other section of the people benefiting from those services? Such questions seem too absurd to merit a serious answer, and yet it is an absolute fact that on the builder and the ratepayer has been piled the huge burden mentioned in the last question quoted. The average reader may shake his head incredulously; but let him read carefully the facts and figures Mr. Williams piles up, and he will not fail to conclude that he has been purposely kept in the dark by all the Departmental Committees and Royal Commissions that have done little else during the last fifty years but add to the waste of paper from which we are all suffering.

In 1901, the population being 32,500,000, the number of men employed in building works of construction amounted to 1,042,864. In 1911, the population being 36,100,000, the number of men employed in building had dropped to 946,127. This is a net deduction in the number of men employed in building of no less than 96,864 in ten years, although the population had increased in that period by 3,600,000. Again, taking the same period from the census in 1901 the number of houses in course of construction for that year was 61,909. In 1911 the number of houses in course of construction was 38,178—23,731 less houses in course of construction, although the population had increased as shown above. With the phenomenal further decline since 1911 our readers are pretty well familiar.

It is well to note here, as Mr. Williams reminds us, that the Departmental Committee in their inquiry on what changes had taken place since the Royal Commission Final Report makes no mention of these facts. The Royal Commission on Local Taxation, 1897, was also a belated inquiry, in the face of the above. If the subject of their inquiry had been dealt with earlier, or even if it had been followed up from then, and Parliament done what they should have done, we should not have our Housing Problem, and a great industry would have been saved from the condition it is in to-day. It will take many years to repair the damage done—not that building should require props from the State, but should bear only its proper share of the burdens and be on equal terms with other kinds of property. Mr. Goschen (and many others), as far back as 1870, considered then that local taxation was a grievous burden falling upon a too limited and particular class of property. One has only to look through the different statistics shown elsewhere in Mr. Williams's book, culled from different official reports, to find that the burdens have increased fourfold at least since the period of 1870.

The inducing cause of this has been the economic ignorance of our local governing bodies. Of the majorities serving as the people's representatives on the various councils, guardians and assessment committees, some are interested in other classes of property, not buildings; others are not interested in any property at all. Not being owners, they are against the owners of all property generally; therefore they attack those most visible to them—the small property owners—by raising assessments on buildings to the highest possible pitch; and most local bodies are agreed upon this, so as to hide as much as possible the rate in the £.

Taking the local governing bodies roughly in two classes, the one class does not mind about the burden of local taxation being put heavily on buildings, as they think it makes their own the lighter. The other class fails to see that by their action they are burdening the class whom they are supposed to represent—the occupiers, or voters (not owners of cottage property). The voters generally, who form the majority (not owners), do not understand that rates and taxes affect rents, therefore they are indifferent; in fact, nearly all non-owners do not understand this question at all, and trouble very little about such matters.

They never realise that, as it is levied, *persons*—not properties—contribute to taxation, and yet was perceived and admitted years ago. In Chapter II., page 108, the Royal Commission Final Report, 1901, anent this question, observes:—We should say that it is more generally and more decidedly held by economic authorities, and we ourselves incline to hold that it is not property, but persons, who contribute to taxation. They also quote Mr.

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(now Viscount) Goschen, when he said, in 1871:—"The term taxes on real property is of itself misleading. If the term generally used were taxes on the owners of real property, it would at once become apparent that the total of rates is by no means paid by them." The Commissioners say:—"It may be observed that while the owners of real property are, of course, a limited class, any burden which falls on occupiers of real property, such as a dwelling-house, affects the whole population of the country." The Committee of Land Inquiry (1912), says:—"We have already seen that the effect of rating buildings is to restrict their supply. As a result, the rent which an occupier has to pay for them is higher than it would be if their supply was unrestricted. Similar considerations apply to buildings other than dwelling-houses and to all other kind of improvements." (Vol. II. page 566.) The above sums up the whole case of the housing problem, apart from the iniquity and injustice that one class of property should be selected to bear all the burdens of local taxation as well as the largest burdens of national and onerous services that should be borne by the broader back of the national taxpayer.

What is the remedy? The clue thereto was given by Mr. Julian Goldsmid, M.P., in a letter dated April 24, 1871, to Mr. Goschen. Criticising Mr. Goschen in having failed to deal with the various subjects arising out of his (Mr. Goschen's) report, Mr. Goldsmid observes:—"In conclusion I may say that the proper method of proceeding appears to me to be the following: Ascertain in the first place the total value of real property, and also personal property of the country; then calculate the income derived from these two classes of property, and also the income derived from the third source, viz., personal exertions of whatever kind, which ought always, I think, to be taxed, if possible, more lightly than the other two. Having done this, see what the present incidence of taxation is upon these three kinds of income. Then settle what portions of taxation these three kinds of income ought to bear, and having to take out of the calculation that expenditure which is purely for the benefit of the locality, see whether the present incidence of taxation is in accordance with the rates you have laid down. If it is not, endeavour to redress it in favour of the side against which the balance inclines. But do not draw general conclusions from such one-sided sets of figures as those given in the papers, in which the fourth element of comparison, viz., the amount of the personal property in the country, is wanting."

Mr. Goschen attempted to reply to Mr. Julian Goldsmid, but with poor success, and he evidently, as will be seen by his speeches when Chancellor of the Exchequer in 1888 modified his views considerably; but unfortunately there are others to perpetuate his old views and prejudices even to the present day. Since 1870 forty-six years have elapsed, burdens have increased, growing in intensity year by year until now they have become intolerable, and the mischief done incalculable. It is, we believe, well within the mark to say, as Mr. Williams does, that for all rates levied throughout England and Wales, five-sixths are for expenses that are national and onerous in character benefiting the community at large. Let readers work steadily through Part II. of his book, which gives an excellent abbreviated history of our Rating Law; through Part III., which demonstrates the need for rating reform; and Parts IV., V., and VI., which summarise and comment on the various Reports, Committees, and Judgments of the past quarter of a century, which have left the scandal unremedied, and they *must* endorse Mr. Williams's contention.

In Part VII. Mr. Williams deals instructively with the history and work of our building societies. Everybody knows that in the early days of these societies, although wages were at a far lower ebb, frugal saving was much more the habit of the class of small investors in house property. But in a far greater degree has the decrease in such investments been due to the discouragement of such thrift by Parliament itself. Government to-day is panicky about the thriftlessness of the people. The pity of it is that the Government was not more alive to the necessity for thrift before. Why should not the Local Government Board take under its wing all sound and approved building societies, and make advances on the security of the property; and where no such societies exist set up such facilities for the masses in convenient centres?

In Part VIII. Mr. Williams incisively summarises the havoc wrought amongst architects and builders. As he points out, the art of building comprises the practice of civil architecture, or the mechanical operations necessary to carry out the designs of the architect into effect. A man may be a competent builder without being an architect, but no one can be an accomplished architect or builder unless he be competent to specify and direct all the operations of building. But as far as the mechanical operations necessary to a large and intricate building go, the builder is indispensable to the architect. Further, the builder is helpless unless he has well-skilled and trained men in all trades at his disposal, and no little training, but a good deal, is necessary to make a skilled and qualified craftsman in any of the branches of the building trade. Therefore it is to the interest of the nation to possess an army of well-skilled craftsmen and skilled labourers. What are the facts? Between 1901 and 1911 an army of men passed out of the building trade in England and Wales of no less than 196,737, although the population had increased in the same period by 3½ millions. The building trade employed more men than any single industry, except agriculture, up to, say, twenty years ago. Architects, builders, and building workmen have no representative in Parliament to protect their trade. Nevertheless, all the people, rich and poor, suffer through the neglect of this industry. At the present time there is a shortage of about 500,000 houses for the working classes alone, leaving out the houses for the lower middle classes, and *if there is any class of people more than another* which feels the need of cheaper and more suitable houses it is the lower middle class. Here are the main practical conclusions at which Mr. Williams arrives:—

(1) That in view of the many urgent problems and grievances which have been shown to arise from the existing system of local administration and taxation—for example, the housing of the working classes, the decay of the building trade, the unjust burdening of the owners and occupiers of buildings for the raising of revenues expended by local authorities, largely for purposes which should be recognised definitely as national purposes, the Government and Parliament should be urged to take immediate steps to transfer from local to imperial taxation all public expenditure which is national in character.

(2) That in view of the confused condition of the laws relating to local rates, a result of a long course of legal interpretation or legislation by the Courts, interrupted only by Acts of Parliament directed to the removal of immediate difficulties, the Government and Parliament should enact a simple Act of Parliament placing on a clear and just basis the taxing of all rateable hereditaments.

(3) In particular, the reform of valuation, which has repeatedly been brought before Parliament during the last fifty years, many bills having been introduced dealing with the subject, should immediately become the subject of effective legislation securing a just and uniform made of arriving at rateable value or net annual value and removing such anomalies as now exist for example between dwelling houses and railway properties. The valuations thus obtained should be the basis of local and of imperial taxation alike, and they should for this purpose be calculated by the Land Valuation Office.

(4) The local ratepayer being, in accordance with the foregoing resolutions, relieved from defraying in the capacity of local ratepayer the cost of national onerous services, the central government might and should raise taxes based on the valuations of real property, and on the sites value and increments as exhibited in such valuations for the purpose of maintaining such services. Such measures would do much to reduce the gross inequalities now existing as between the needs of rich and poor localities, and as between the financial burdens cast upon these localities respectively.

(5) That the acquisition, whether voluntary or compulsory, of land and buildings required for public purposes should henceforth be entirely administered by the Local Government Board, even in cases in which the land and buildings after such acquisition are to be administered by local authorities.

(6) That all moneys henceforth required for the purchase of land and buildings for the cost of improvements, etc., be paid by the Central Government from its revenues through the Local Government Board, and that revenues derived by the State from the lands, houses, increment and betterment values be paid to Board.

(7) That the Local Government Board be em- the Government through the Local Government powered to sell, let, or lease plots for building or for other purposes, and that its dealings with the parties interested should be carried on through agents of the Central Government, such as the Inland Revenue Authorities, and not through local governing authorities.

(8) That the Local Government should have qualified consultative staff, consisting of engineers, architects, surveyors, and valuers, to advise and direct upon all building schemes to be undertaken. This staff should also be responsible for recommending and protecting building and town-planning and development schemes for the whole of England and Wales; this area should, however, be divided into convenient smaller areas, which should have their local surveyors working under the direction of the consultative staff, and in touch with the local governing bodies.

(9) That the hindrances and discouragements to building, and particularly to good building, arising out of the prevailing system of terminable leases, should be removed by a measure of leasehold enfranchisement containing securities for fair and reasonable terms; and that such measures should enable persons who in future require land for building purposes to acquire at their option the freehold of the property from the outset.

With regard to clauses 5, 6, 7, 8, and 9, we suspend judgment. Our present unfortunate experience of Government Departments are not encouraging enough to anticipate with complacency the entire transfer to the Local Government Board Mr. Williams favours; but with his suggestions for the transfer of really national taxation to national control we concur. The unfair incidence of the cost of in many cases unwise or extravagant local expenditure during the last thirty years has not yet reached its worst development, but it is as already unbearable as it may presently prove irretrievable.

Nottingham Corporation Baths Committee reports in favour of acquiring the Turkish baths now belonging to a private company. The Town Clerk has been in negotiation with representatives of the company, and it has been ultimately arranged to purchase the property for the sum of £5,400 as from December 31 last. The Baths Committee is convinced of the necessity of continuing these baths, and looks upon this as a favourable opportunity for acquiring the premises at a reasonable price, the mortgage of £3,700 being merged in the purchase money.

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HEAT TRANSMISSION THROUGH WINDOW SASHES.

In the absence of any authentic data on the relative heat loss through single and double-glazed wood, steel, and hollow metal sash, experiments were carried out by W. S. Brown, under the direction of Arthur N. Sheldon, the results of which are incorporated in a paper read by Mr. Sheldon before the American Society of Mechanical Engineers.

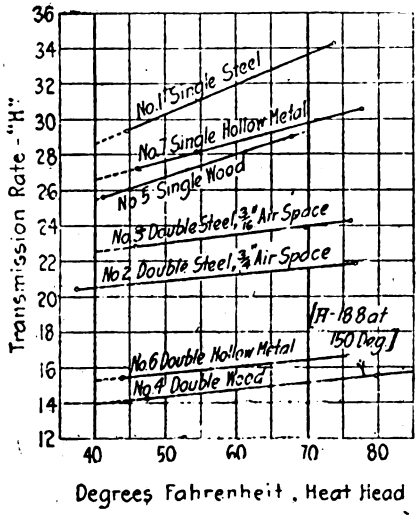
ARRANGEMENT OF APPARATUS.

The test apparatus consisted of an air-tight, cork-covered, wood box, one side of which was closed by the sash to be tested. Care was taken to reduce to a minimum the leakage around the sash at its line of contact with the box. An electric heater in the bottom of the test box maintained the desired temperature difference between inside and outside air. The loss of heat was computed from wattmeter reading, and a quantity H—the B.T.U. transmitted per twenty-four hours per square foot of exposed surface per degree difference of temperature—was determined for each type of sash. Tests were made at approximately 40 and 70° Fahr. temperature difference under conditions closely imitating the actual in practice. Temperature control of the air surrounding the test-box was obtained by means of a thermostatically controlled steam radiator. Constant room temperature was desired because any appreciable variation of this temperature would materially affect the accuracy of the results on account of the temperature lag of the materials of which the box was constructed.

AIR CIRCULATION PROVIDED.

Circulation of air over the surface of the sash to be tested was provided by means of two 12-in. fans, placed one above the other, 4 ft. from the vertical centre line of the sash, and which directed air currents against the sash at an angle of 30°, providing a positive circulation over it. Baffle boards secured protection of the back and sides of the box from air currents created by the fans. This was necessary because the heat transmission constants for the box alone were obtained under conditions of still air. The humidity of the air inside the test-box was kept as constant as possible throughout the series of tests by means of water-saturated felt, and was measured by means of a wet-and-dry-bulb hygrometer. The humidity remained constant during the period of each individual test.

In order to determine what portion of the total heat was conducted through the sash



Comparative Heat Transmission Rates through Various Types of Sash.

in a given test it was necessary to subtract from the total the amount lost through the back, sides, top, and bottom surfaces of the box. The latter amount was ascertained by means of "blank-run" tests, the front of the box being covered in the same manner and with the same materials as the other surfaces. The mode of conducting the test was similar to that of operating the sash tests, except that the fans were not in operation, as the object was to obtain the rate of transmission through the box and covering under the conditions of the main tests—that is, still air for the back, sides, top, and bottom.

Tests were conducted on the following seven samples of sash:—1, single-glazed, solid, rolled steel; 2, double-glazed, solid, rolled steel with ¾ in. air space; 3, double-glazed, solid, rolled steel with 3-16 in. air space; 4, double-glazed wood; 5, single-glazed wood; 6, double-glazed hollow material; and 7, single-glazed, hollow metal sash.

TABLE 1.—HEAT TRANSMISSION RATES AT APPROXIMATELY 40 DEGREES F. TEMPERATURE DIFFERENCE.

Sample.	Actual heat head. Deg. F.	H computed at actual heat head.	H corrected to 40 degrees F. heat head.	Relative humidity.	Condensation.
1. Single-glazed solid steel	44.5	29.3	28.5	36	None
2 Double-glazed solid steel—¾-in. air space	37.4	20.4	20.5	34	None
3. Double-glazed solid steel—3/16-in. air space	45.7	22.8	22.5	43	Very slight on air-space side of one outside pane and box side of one inside pane
4. Double-glazed wood—⅞ in. air space	47.3	14.2	13.9	49	None
5. Single-glazed wood	41.2	25.6	25.5	44	Hardly noticeable
6. Double-glazed hollow metal ¾-in. air space	43.9	15.4	15.2	54	On air-space side of one outside pane
7. Single-glazed hollow metal ..	46.0	27.1	26.4	43	All

TABLE 2.—HEAT-TRANSMISSION RATES AT APPROXIMATELY 70 DEGREES F. TEMPERATURE DIFFERENCE.

Sample.	Actual heat head. Deg. F.	H computed at actual heat head.	H corrected to 70 degrees F. heat head.	Relative humidity.	Condensation.
1 Single-glazed solid steel	73.9	34.2	33.6	28	All
2. Double-glazed solid steel—¾in. air space	76.8	21.8	21.6	29	Fifteen outer panes out of twenty showed moisture on air-space side
3. Double-glazed solid steel—3/16 in. air space	76.0	24.2	24.0	30	One outer pane showed moisture on air-space side; one inner pane showed moisture on box side. Three lights showed both the above
4.* Double-glazed wood—⅞ in. air space	79.8	15.5	15.1	31	None
5. Single-glazed wood	67.6	28.9	29.3	29	Twelve lights
6. Double-glazed hollow metal—¾ in. air space	75.6	16.6	16.4	36	On air-space side of one outside pane
7. Single-glazed hollow metal ..	77.7	30.5	29.7	25	All

* A test upon this same wood sash with the inside panes of single-thick plain glass instead of double-thick showed an increase in H of 3 per cent. at 70 degrees F. temperature difference.

COMPARATIVE HEAT TRANSMISSION RATES.

A resumé of the comparative heat-transmission rate is given in tables 1 and 2. The results of the tests have also been plotted in the form of curves, as shown. It is shown that the heat loss is greater through the single-glazed sash than through the double-glazed; that it is greater through metal than through wooden sash; that it is greater through solid metal than through hollow metal sash, and that in double-glazed sash it decreases with increased air spacing between the panes of glass. From the curves it will be noted that the rate of transmission increases with the heat head (temperature difference between outside and inside air), and that there is a greater increase or steeper curve for the single than the double-glazed sash.

To obtain an indication of the paths of heat transmission the temperatures of the glass and sash bars were taken during each test. It was found that for a given temperture difference the solid steel sash bars were hotter than the wooden bars, and by their greater conductivity constituted a direct path for the transmission of heat to the outside air. The hollow metal sash bars were cooler than the solid steel, but warmer than the wood. Indirectly, a further heat loss through the glass itself, in the case of double-glazed sash, can be laid to the solid steel section. Since the amount of heat lost through a given pane of glass depends directly upon the difference in temperature between the two sides, it is evident that in a double-glazed sash the rate of heat transmission through the lights must increase with the temperature difference between the air space and the outside air. The tests showed that the temperature difference between the air in the ¾ in. air space of the steel sash and the outside air was at least 20 per cent. higher than the corresponding temperature difference in a wood sash, evidently due to the effect of the enclosed air of the warmer steel sash bars.

CAUSES AND PREVENTION OF CONDENSATION.

Tests were also conducted to determine the cause of condensation in double-glazed sash and its prevention. Condensation appeared on the single-glazed sash when its temperature was low enough to cool the air confined within the test box below the dew point. The moisture was evident on the inside of the panes. Where condensation occurred in the air space of double-glazed sash, it was always on the outside pane of glass, which, of course, was the cooler one. The wood sash showed no internal condensation, but in the two steel sash condensation was very marked, and was evident in the hollow metal sample. The deposition of moisture seemed to follow no obvious law, occurring on some lights and not on others. As this inconsistency was most pronounced on the solid steel sash, they were selected as the most suitable for investigation. The steel sash, with a ¾-in. air space, was chosen for the preliminary tests, experiments being also conducted afterwards on the hollow metal and wood sash to verify or disprove the previous conclusions.

Holes were bored through each of several of the outer panes of wire glass, of which some had and some had not shown condensation. Smoke was then blown into the various air spaces through these holes and leaks to the outside or to adjacent air spaces carefully noted. Considerable leakage was observed, either to adjacent air spaces or to the front or back or to a combination of these. It was observed that in lights where condensation was evident the greatest leakage was into the inside of the box, and that in those lights where no condensation occurred the greatest leakage was to the air outside the box. Other lights showed serious leaks to both sides and to adjacent air spaces and also showed condensation.

EXPERIMENTAL CONCLUSIONS.

Following this clue, the entire sash was reglazed and holes bored in seven of the outer panes, and in five of the inner panes, thus establishing free communication either to the external cool or to the warmer air

inside the test box. All the other panes were carefully bedded and set so as to be air-tight. A test on this sash showed the following results: (a) Lights in which the air-space opened to the outside or cooler air only showed no condensation; (b) lights in which the air-space opened to the warm air inside the test-box showed much condensation. The sash was reversed, with its outer side toward the interior of the test-box, and the above results were confirmed.

The explanation is that changes in temperature on either side of the sash cause corresponding, though less marked, changes in the temperature of the air-space. The pressure of the combined air, therefore, becomes more or less atmospheric pressure, and air is correspondingly either forced out of or admitted through the drilled holes, and, if a temperature difference is alternately increased and decreased, a "breathing" action obtains in the air-space. A similar action occurs through leaks in actual practice, and is due to daily variations in temperature and the longer seasonal changes. Air entering an opening of this kind from the inside, coming as it does from the warm interior of the test-box or building, becomes chilled and its relative humidity correspondingly increased, condensation necessarily appearing if the cooling is carried on below the dew-point. "Breathing," or a repetition of this process, necessarily results in a gradual accumulation of condensation. Conversely, air entering an opening of this kind from the outside becomes heated, and its relative humidity correspondingly decreased, making impossible the precipitation of any moisture.

The double-glazed wood sash, when tested in the same manner, showed no traces of condensation in any of the air-spaces.

A Suggested Remedy.

These experiments indicate that condensation in the air-space of double-glazed sash can be eliminated almost entirely by connecting the air-space directly to the outside air and at the same time effectively sealing it from the entrance of the warm air within the building. It is suggested that the openings should be very small, equivalent, say, to a $\frac{1}{4}$-in. hole, designed merely for a communication between the internal air-space and the outside air during temperature changes. This "breathing hole" should be protected from the weather and dirt. Its location seems to be immaterial from the standpoint of elimination of condensation, but a consideration of heat economy would indicate that the bottom of the light is preferable. Whether or not, as a practical problem, this method can be applied to seal the inside panes of double-glazed steel sash, and leave an opening in the outside panes, is worthy of the careful consideration of steel sash manufacturers. The results of these tests should not be construed as indicating that double-glazed wood sashes never show interior condensation, but merely that they are superior to steel and hollow metal sash in this respect in the present stage of development of the latter types.

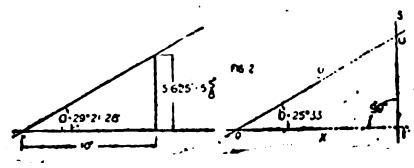
Professor Lorentz Dietrichson, the well-known writer on Norwegian art and literature, died last Thursday at the age of 83 years. He was a pioneer in the art life of Norway, having taken the initiative in that department in different institutions. He reorganised the National Gallery and promoted the establishment of the Academy of Fine Arts. Among his many works is a complete historic description of monuments left by the Norsemen in the Orkneys. It was published in Norwegian and in English in 1906.

A reorganisation of the Public Works Department of the Birmingham City Council, in order to relieve the City Surveyor (Mr. H. E. Stilgoe) of unnecessary detail work, has been recently effected. The city has been sectionalised into administrative divisions, to be known as the Central, Eastern, and Western. Mr. H. H. Humphries, Surveyor to the Erdington Urban Council, before its incorporation in the city, has been appointed Deputy City Surveyor, and temporarily in charge of the Central Division. Mr. H. Richardson, formerly the Surveyor to the Handsworth Urban Council, has been appointed Chief of the Western Division, whilst Mr. W. C. E. Lawton, formerly Surveyor to the Yardley Urban Council, has been appointed Chief of the Eastern Division.

HOW TO PLOT ANGLES ACCURATELY IN FRACTIONAL PARTS OF A DEGREE.

The following is a simple and accurate method of plotting angles, especially where they are to be interpreted in fractional parts of degrees which would be difficult to read from ordinary protractors.

As an example, let it be required to lay off an angle of 29° 21′ 28″. By consulting a table of natural tangents we find the tangent of the given angle to be .5625, and as this represents



A method of plotting angles where they are interpreted in fractional parts of a degree.

the altitude of a right-angle triangle whose base is unity, it is quite evident that, if we lay off a base line 10 in. long, the altitude will be 10 in. × .5625, or 5.625 in., as in Fig. 1.

Again, suppose it is required to determine the angle *b*, in Fig. 2

Lay off on *o*—*x*, or *o*—*x* produced, *o*—*t*, equal to 10 in. and from *t* erect a perpendicular *t*—*s* of any convenient length. Extend *o*—*y*, if necessary to intersect *t*—*s* at *u*.

For reasons previously explained, *t*—*u* is ten times the natural tangent of angle *b*. Therefore, if *t*—*u* is measured and found to be 4.78 in., the tangent of *b* will naturally be 4.78 ÷ 10, or .478 = 25° 33′.—Harry B. Wrigley, in the *Popular Science Monthly*.

LONDON COUNTY COUNCIL.

The Buildings Sub-Committee of the Education Committee have reported as follows:—

On July 28, 1915, we reported that, with a view to making economies in the planning and construction of elementary schools, revised preliminary plans had been prepared for the erection of an elementary school in the Stowage (Greenwich), and that the scheme, whilst complying with the requirements of the Board of Education's building regulations (1914), could be carried out at a considerably less cost than the scheme which had already been approved by the Committee and the Board. The Committee decided to submit the revised preliminary plans to the Board for approval. The Board (21/9/15) replied as follows:—

"With reference to Mr. Allen's letter of 5th ultimo (E. 13), I am directed to state that the Board notice that the revised plans have been so contrived that none of the classrooms open off the hall directly, but they do not get the advantage of the cross-ventilation which has been provided in the more recent schools erected by the London County Council. The Board, while regretting the loss of this feature, to which they attach importance, have no doubt that the Council on this occasion consider that the advantage must be foregone for reasons of economy. It is suggested that, in order to compensate as far as possible for the loss of the cross-ventilation, the windows should be so constructed as to give the maximum of opening. The plans are returned herewith."

The architect has since carefully reviewed the details of the construction, the statical condition of the buildings to be provided, and the specification of the materials to be adopted, with a view to arriving at a form of construction which it would be reasonably easy to maintain, without serious additional maintenance charges, for a period of say forty years. We decided to refer the architect's report to a special section to consider, and we have now received their report. The section have considered in detail the various alternative methods of construction submitted by the architect, and we have approved the economies suggested by the section. These are set out in recommendation (a) (i.) to (xiii.) below.

If the whole of these recommendations are approved, the cost per head of the main building will be £11 4s. 9d., as compared with £15 15s., showing a net reduction of £4 10s. 3d. per head, equivalent to a reduction of £4,045 on a standard school of 896 places.

We propose that the amended plans and specification shall be adopted as the authorised standard for future elementary school buildings, and we submit a recommendation accordingly. It will be necessary to inform the Finance Committee under standing order No. 243. We recommend:—

(a) That the Education Committee do approve the economies set out hereunder in regard to the plans and specification of the proposed Stowage L.C.C. School (Greenwich), and that the Finance Committee and the Council be informed accordingly:—

(i.) That the condensed planning scheme presented by the architect for the proposed Stowage School (Greenwich) be regarded as generally satisfactory.

(ii.) That the "drop system" of heating apparatus be adopted in lieu of the "two-pipe system."

(iii.) That thinner walls, etc., be provided, involving a saving on the cost of brickwork.

(iv.) That Fletton brickwork, faced externally with stock and special bricks, be adopted, in lieu of stock brickwork faced externally with red bricks.

(v.) That ornamental brick cornices to elevations be omitted.

(vi.) That the concrete in floors of classrooms, halls, and corridors be reduced in thickness and topped with coke breeze concrete, and that $\frac{7}{8}$-in. plain flooring be nailed thereto, in lieu of the proposed provision of floors with fillets fixed in concrete and $1\frac{1}{8}$-in. grooved and tongued flooring to classrooms and wood-block flooring to halls and corridors.

(vii.) That stone dressings to entrances be not provided.

(viii.) That steel and concrete landings be provided to staircases in lieu of York stone landings.

(ix.) That Delabole slating be provided in lieu of Westmoreland slating, and that the scantling of the carcassing be reduced.

(x.) That lines and pulleys be provided to windows in lieu of rod window gearing.

(xi.) That glazed dadoes be provided in the classrooms, halls, staircases, and corridors, the brickwork above to be fair faced and distempered.

(xii.) That saving be effected on various small items, and also in respect of quantity surveyor's fees due to the reduced cost of building.

(xiii.) That the provisional sum included in the specification for testing floors be omitted.

(b) That it be an instruction to the architect that the amended plans and specification of the proposed Stowage L.C.C. School (Greenwich) do form the authorised standard for future elementary school buildings; and that such steps as are possible be taken with a view to a school of this type being constructed at the earliest possible moment; and that the Council be recommended accordingly.

The "tube" railway which the Post Office is constructing beneath London to facilitate the despatch of mails is the subject of an account, published on March 6, showing that up to March 31 last year £355,496 had been expended on the scheme. There remained £744,503 unexpended out of the authorised issue.

The death is announced of Mr. Alfred O. Townsend, at Ivydene, 36, Lower Redland Road, Bristol, aged 71, a prominent artist. His paintings, many of which were of local scenery, were of considerable merit. He was associated, too, with the Bristol and Clifton Arts and Crafts Society, in which he took a practical interest.

The Western Highways Committee of the Norfolk County Council has now found it desirable to make the appointment of county surveyor a permanent one. Since the death of Mr. Heslop, the late county surveyor, the appointment had been temporarily held by Mr. W. W. Gladwell, and it has been unanimously decided that he be recommended to the county council to be confirmed in the appointment. His present salary is £300 a year, and the recommendation is for a salary of £400 a year, with annual increments of £25 per annum until £500 is reached.

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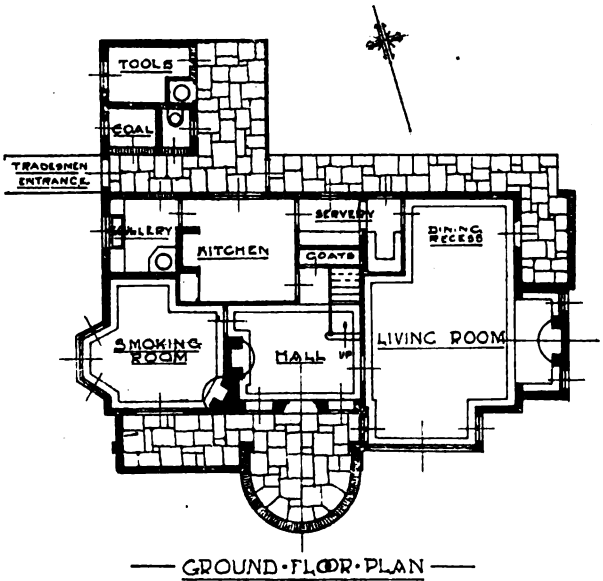
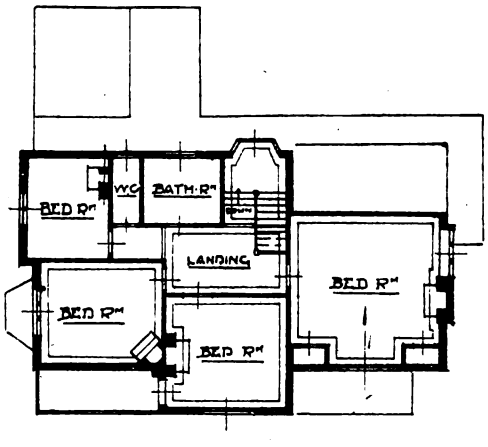
RESIDENCE · YARDLEY WOOD · BIRMINGHAM

FOR · E^D FARDON ESQ

HORACE G BRADLEY, ARCHCITECT



GROUND · FLOOR · PLAN



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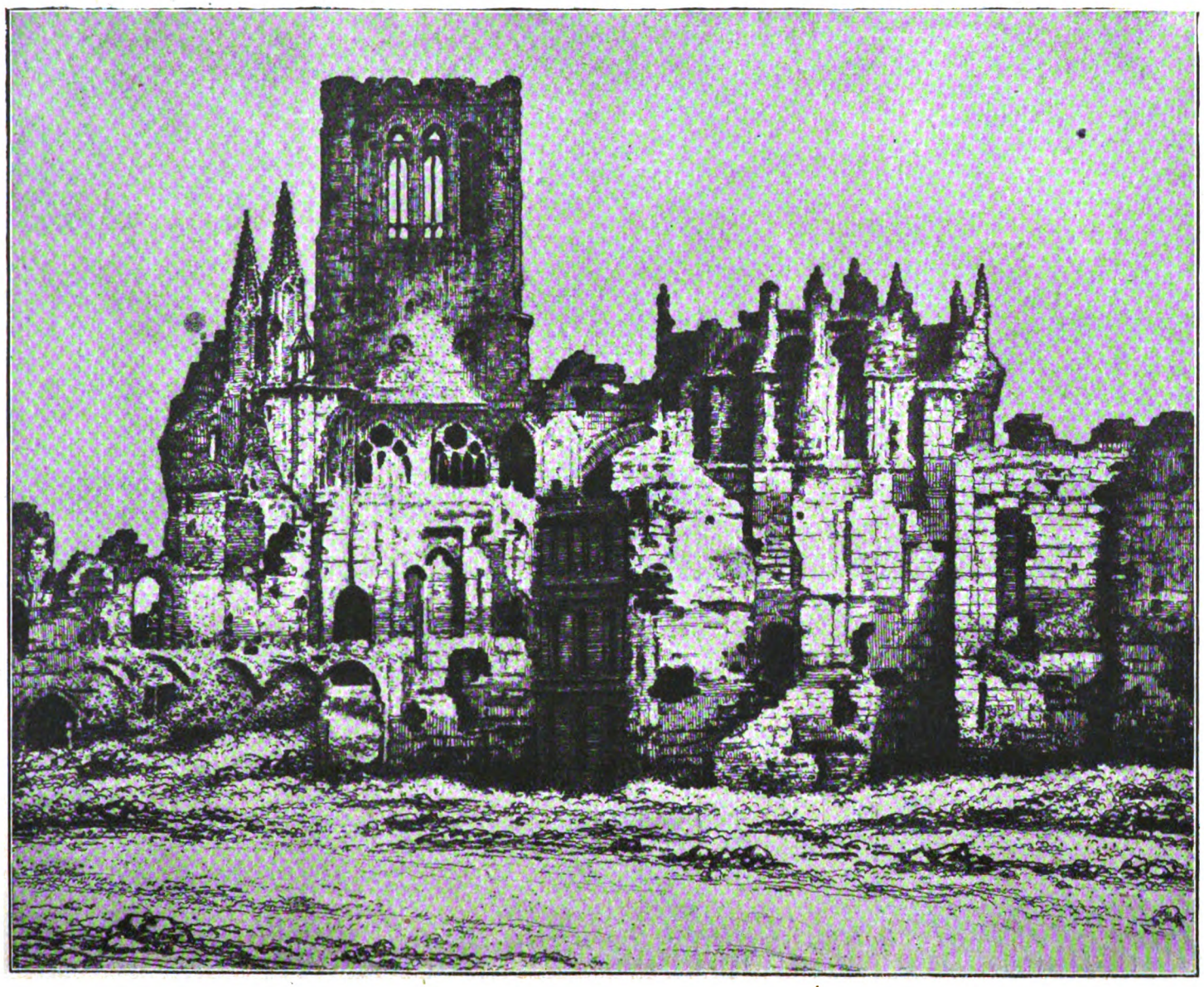

THE RUINED CATHEDRAL OF ST. MARTIN, NEAR THE DEMOLISHED CLOTH HALL, YPRES.
(Royal Academy Exhibition fo Graphic Art).—From an Etching by Mr. FREDERICK MARRIOTT, A.R.E.

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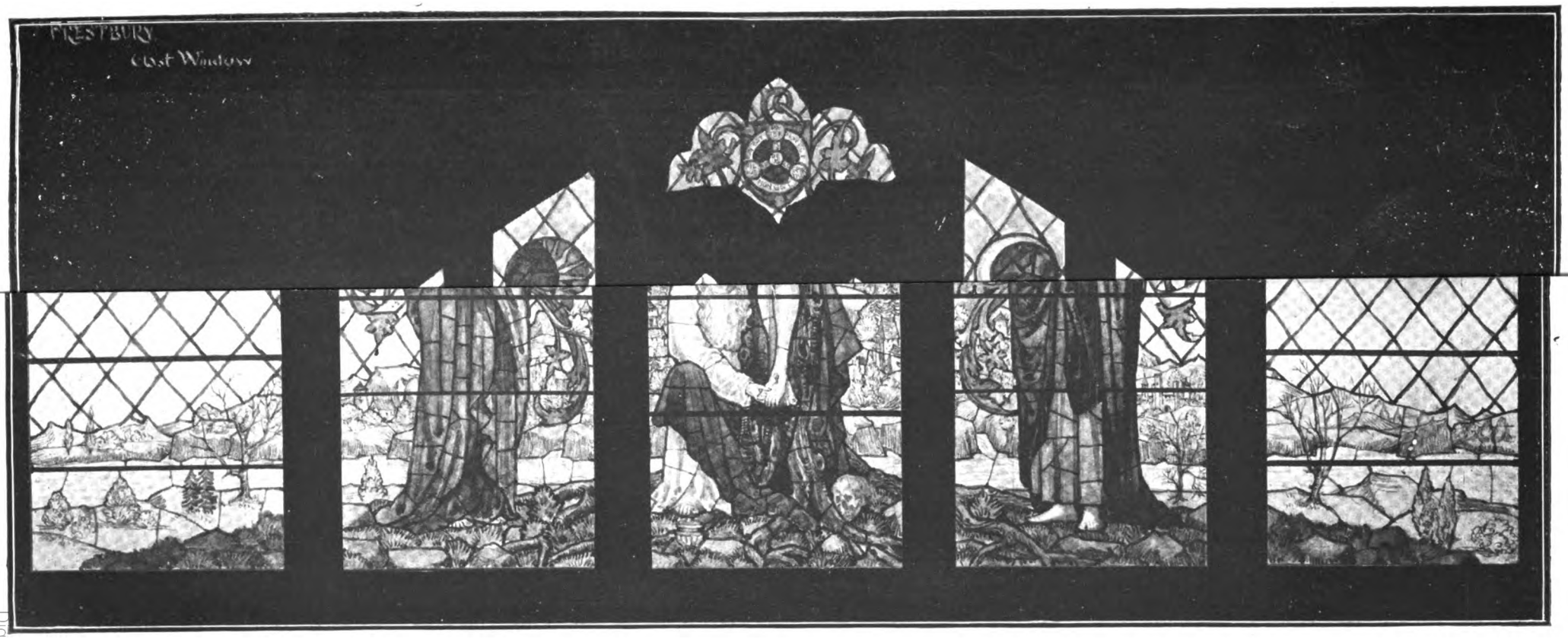

THE NEW EAST WINDOW, PRESTBURY CHURCH, CHESHIRE: "THE CRUCIFIXION" AND "TREE OF LIFE."
Designed and executed by Mr. ARCHIBALD K. NICHOLSON.

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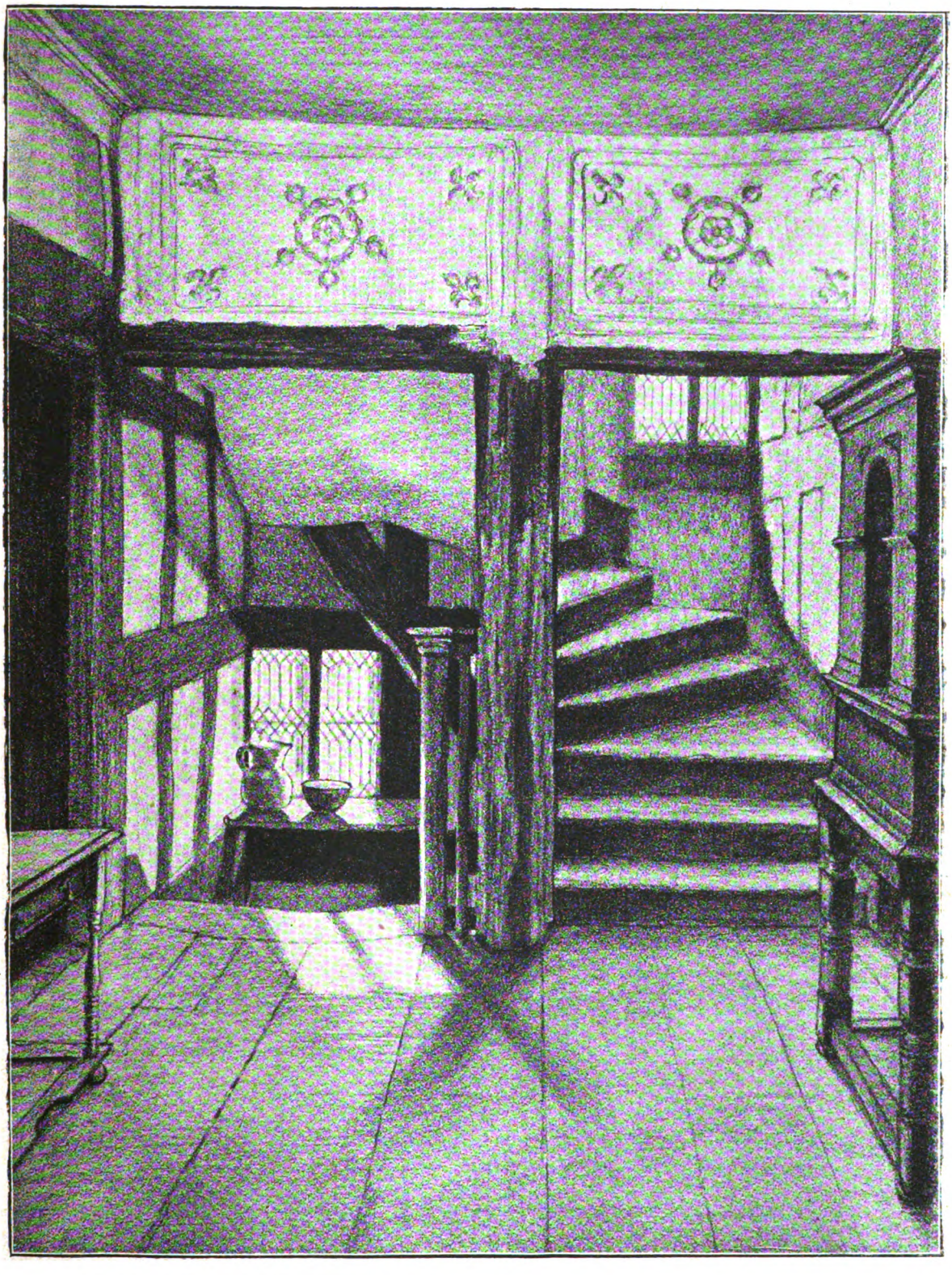

STAIRCASE, THE READER'S HOUSE, LUDLOW, SHROPSHIRE.
(Royal Academy Winter Exhibition of Graphic Art)
From a Lithograph by Miss BESSIE M. DIBBLEE.

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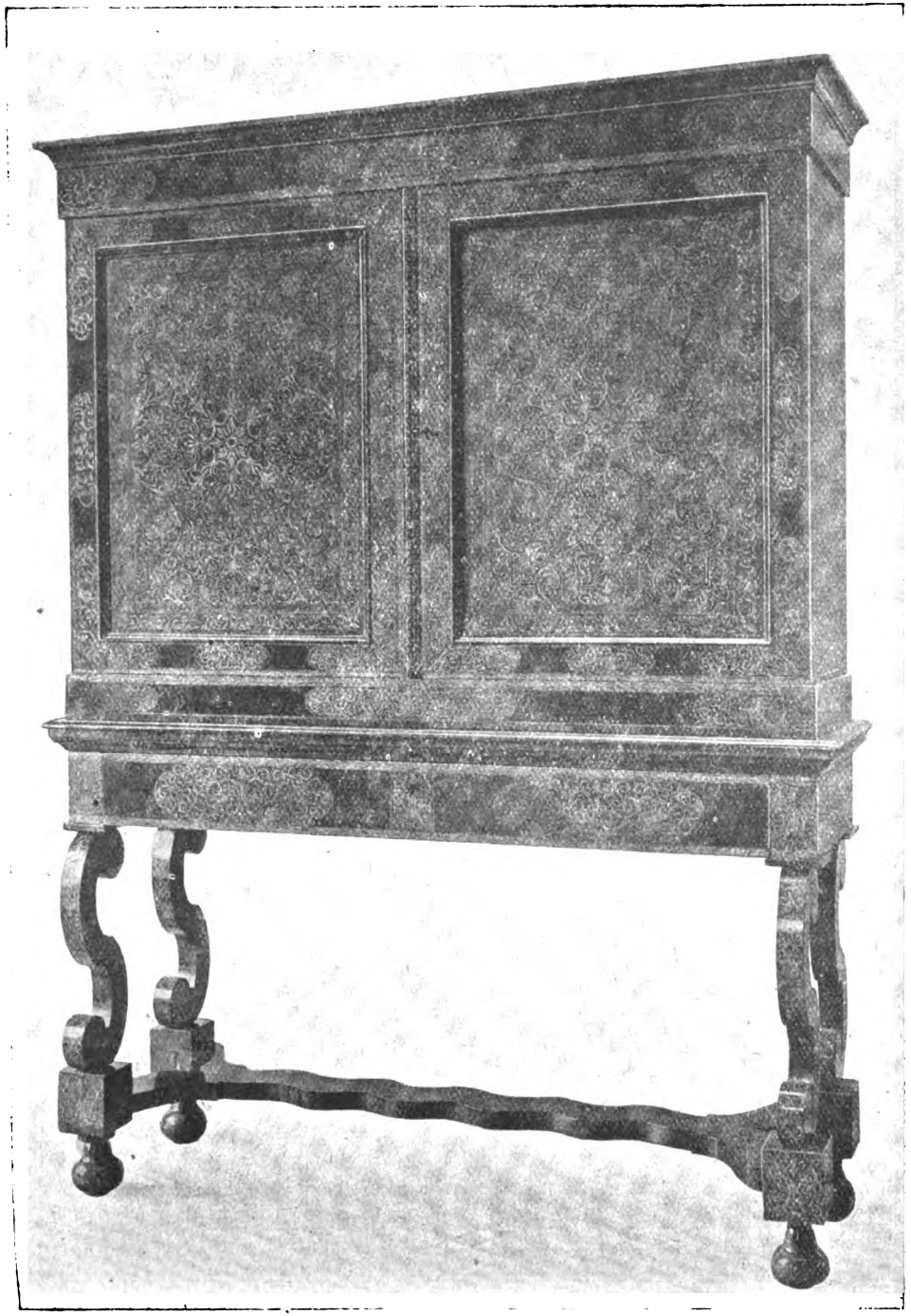

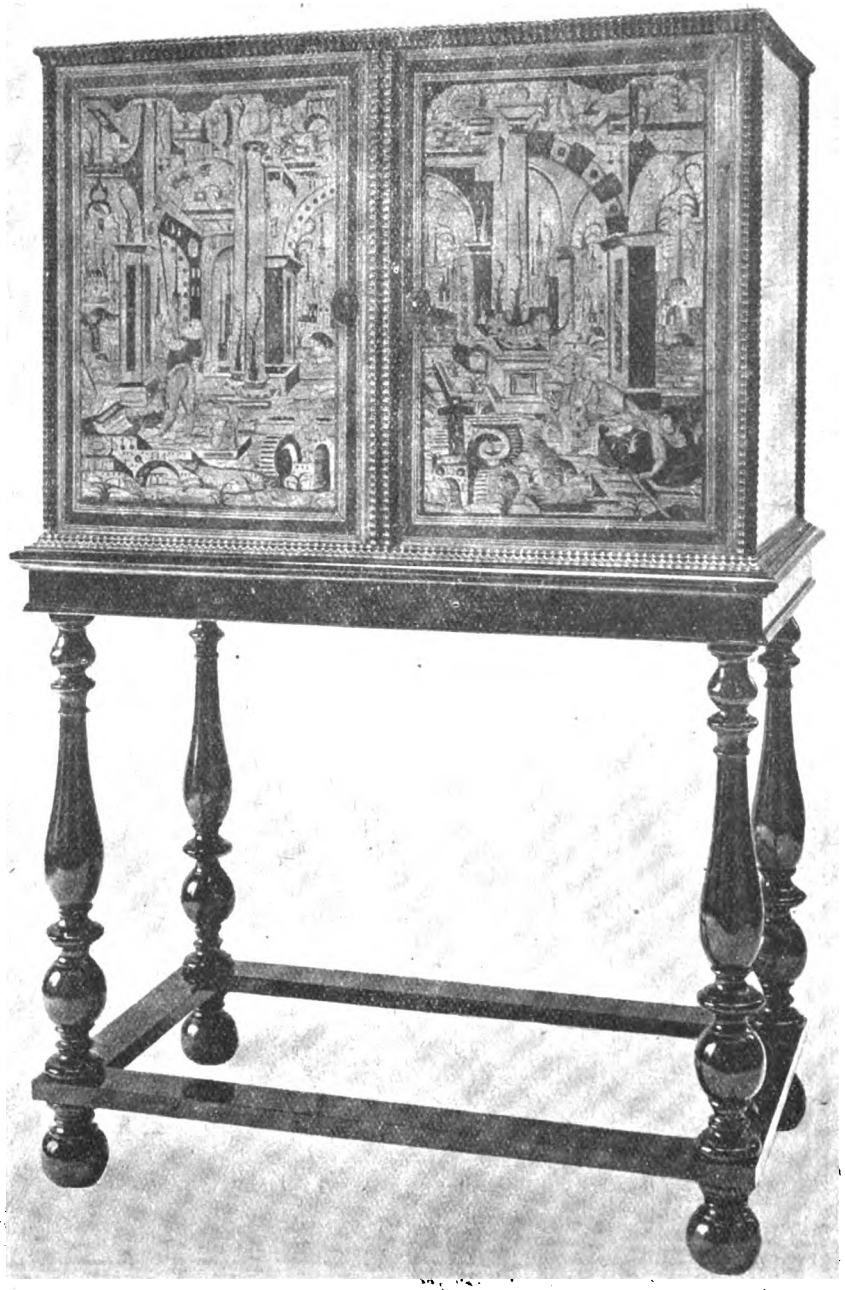

A PAIR OF OLD WALNUT CABINETS, "WILLIAM AND MARY" AND ITALIAN, FROM 2, PORCHESTER GATE, W.
Sold by Messrs. KNIGHT, FRANK AND RUTLEY.

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Our Illustrations.

NEW EAST WINDOW, PRESTBURY CHURCH, CHESHIRE.

This well-known picturesque village is familiar to many architects, chiefly, perhaps, in connection with the curious and almost unique little Tudor "Magpie" house opposite the parish church in the main street. The nave of the church—rather a fine building—is divided from the chancel by an unusual and heavy old classic screen, which greatly interferes with the view of the east end, and consequently Mr. A. K. Nicholson's fine work cannot properly be seen on entering the building by the western door. The author of the window says there is very little to print by way of description. The Tree of Life bears the figure of the crucified Christ, and in the background is seen the "New Jerusalem," with the "River of Life" flowing round the heavenly city. On either side of the Saviour stand the supporting customary figures of the Blessed Virgin and St. John the Divine. On the branches of the Tree are shields showing the emblems of the Passion, and angels are hovering above, holding chalices.

THE RUINED CATHEDRAL OF ST. MARTIN, YPRES.

Mr. Frederick Marriott, A.R.E., has lent us this interesting etching from the Royal Academy Exhibition of Graphic Art. The Cathedral of St. Martin, a Gothic edifice of large proportions, grouped very pleasingly with the Great Cloth Hall. Both buildings now are reduced to ruins, including the major part of the famous city of Ypres. The "Town House," or big "Cloth Hall," with its overmastering tower, has suffered most. The church still retains its tower. Bishop Jansen, the founder of the Jansenists, who held the see up to his death in 1633, was buried in the choir. Mr. Marriott shows in the same exhibition a companion etching of what is left of the Ypres Cloth Hall, and some capital colour prints, including a street in Chinon, the Chateau Monthazon, France, and Falaise by night, besides a lithograph from Taranto, Italy.

STAIRCASE OF THE "READER'S HOUSE," LUDLOW.

This well-known half-timbered building ranks among the architectural treasures which all students travel to see when they visit the town. The interior has not often been illustrated, so Miss Bessie Dibblee's charming lithograph of the staircase from the Royal Academy Winter Exhibition of Graphic Art will be welcomed by many. The drawing shows a very typical example of a West Country Jacobean stairway, enriched by contemporary plastering, modelled with heraldic devices at the top of the timber framings. The old house derives its name from an owner called "Reader," who held an office in the Pilgrims' Guild, or Ludlow Palmers' Guild, now filled by trustees acting for the administration of King Edward VI. Charity as "Assistant to the Rector." Part of the structure is said to date back to 1220. It was more or less rebuilt in Tudor times, and the Tudor rose, the pomegranate of Catherine of Aragon, and fleur de lys belong to that period.

RESIDENCE, YARDLEY WOOD, BIRMINGHAM.

This compact and conveniently arranged suburban house has been lately erected for Mr. Edward Fardon under the supervision of Mr. Horace G Bradley, architect, of Birmingham. The lay-out of the plan looks economic and comfortable, with the aspects well considered. The kitchen part is neatly screened off, and the service seems handy for meals.

A PAIR OF OLD WALNUT CABINETS AND UPHOLSTERED CHAIRS FROM 2, PORCHESTER GATE, W.

Last week Messrs. Knight, Frank, and Rutley, by direction of the executors of the late Charles Durant Kemp-Welch, sold the contents of this West End mansion, including some very interesting historic furniture, a few pictures, and examples of porcelain. The two pieces illustrated side by side to-day are a William and Mary walnut cabinet and an Italian inlaid walnut cabinet. The first-named is profusely inlaid in scroll design of satin wood, and edged with engraved borders. It is fitted with three shelves, and enclosed by a pair of sunk panelled doors. The table-stand to it corresponds well with a long drawer and shaped supports on ball feet, and having a stretcher rail. It is 6 ft. 5 ins. high and 4 ft. 10 ins. wide. The second example, of Italian origin, has bold inlay of architectural forms and figures. A musical trophy occurs on the top. The side and rear panels are all *in situ*. The cabinet has folding doors, enclosed with waved mouldings on the framings. The interior has secret and other drawers, also a cupboard. The ebonised stand on which it is supported measures 2 ft. 7 ins. wide. Our second illustration shows a pair of Chippendale high square back chairs, upholstered in old Petit Point needlework of garden scenes and figures on the backs, and birds and trees on the seats. The chairs have square mahogany legs and stretcher rails.

A PAIR OF CHIPPENDALE HIGH SQUARE-BACK CHAIRS, UPHOLSTERED IN OLD PETIT POINT NEEDLEWORK, FROM 2, PORCHESTER GATE, W.

Plans are being prepared for the enlargement of the Church Army Rest Hut, Hayes.

Mr. John Crust, architect, formerly of Harrogate, and now of Sydney, son of the late Mr. James Crust, of Harrogate, and of Mrs. Crust, St. Mark's Avenue, Harrogate, has been married at Launceston, Tasmania, to Miss Irene Perrin, of "Goorak," York Street, Launceston.

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COMPLETION OF ST. MARY'S CATHEDRAL, EDINBURGH.

The Scottish metropolis has received a welcome addition to its many architectural features of beauty and interest by the completion of the western spires of the Cathedral Church of St. Mary, which was commenced, thanks to the munificent bequest to the Scottish Episcopal Church, as residuary legatee, of two sisters, Misses Barbara and Mary Walker, of Coates, whose property was valued shortly after the death in 1871 of the latter at nearly a quarter of a million. In devising their estate to a permanent body of official trustees, to be held for the Scottish Episcopal Church, the Misses Walker laid it as a first obligation upon them to accumulate the income of the estate until a sufficient sum was in hand to defray the cost of erecting a church, which they desired should be known as the Cathedral Church of St. Mary, upon a site they had reserved for the purpose on their lands of Drumsheugh. The trustees obtained an Act of Parliament in 1877, under which they were incorporated as "the Walker Trustees," and were empowered to borrow on the security of the heritable property, £35,000, to be repaid in thirty yearly instalments, in order, with the accumulated income already available, to meet the total cost of the Cathedral then in process of erection, so that the residuary legatee might not be debarred from deriving benefit from the estate until the Cathedral had been paid for. The sum proved insufficient, for, owing to a great rise in the cost of wages and building material, and to unexpected difficulties in laying the foundations, the Walker Trustees were compelled to release the contractors from proceeding with the full completion of the architect's designs.

Accordingly they handed over the Cathedral to the Bishop of the diocese in October, 1879, completed so far as concerned its immediate uses as a place of public worship, but shorn of its Chapter-House and of the spires on its two western towers, which still were overtopped by the roof of the nave. The Chapter-House was added in 1891, from a bequest by Hugh James Rollo, W.S., who had been factor to the Walker Trustees, and Registrar of the Diocese of Edinburgh. It was left to Dr. Walpole, who was consecrated Bishop of Edinburgh in 1910, to set on foot a movement for collecting subscriptions for the erection of the western spires in grateful memory of Barbara and Mary Walker. He took the matter up within a year of his consecration, and has seen his labours brought to a happy end within the six following years. The fabric, as completed, has cost altogether about £144,000, of which £13,200 represents the cost of the twin western spires.

Their erection has been carried out under the direction of Mr. C. M. Oldrid Scott, architect, Westminster, who has followed closely—except in a few minor details—the original designs of his grandfather, Sir G. Gilbert Scott, R.A. The execution of the work was entrusted to Messrs. E. C. Morgan and Sons, builders, Glasgow. Mr. E. C. Morgan acted as Clerk of Works for Sir Gilbert Scott all the time (1873-9) that the erection of the main building occupied: he was also the builder of the Chapter-House. It had been a long-cherished ambition with him that he should have a hand in finishing the fabric, in which he took a deep interest. Though almost an octogenarian, he came forward four years ago with a spirited offer to build the spires at what was considered a low contract price; and when his offer was accepted he set about the work. The outbreak of the war handicapped him heavily in many ways, and he did not live to see the second spire completed. He died in October last, at the age of 83.

The height of the twin spires is 209 ft., the central spire—at the intersection of the nave, transepts, and chancel—being 67 ft. higher. It may be of interest to compare the dimensions of St. Mary's with those of some of Scotland's more ancient fanes. Its external length is 262 ft., that of St. Giles's, Edinburgh, being 198 ft.; of St. Mungo's, Glasgow, 319 ft.; and of St. Magnus's, Kirkwall, 226 ft. In width, St. Mary's measures 67 ft.; St. Giles's is considerably wider, but St. Mungo's and St. Magnus's are narrower by 4 and 11 ft. respectively. The height of St. Mary's central spire, 276 ft., exceeds that of the spire of Glasgow's old Cathedral by 21 ft. St. Mary's is the only triple-spired Cathedral in Scotland. England possesses two—at Lichfield (twelfth century), where the three spires are more effectively grouped; and at Truro (nineteenth century), where the spires are a few feet less respectively than their contemporary Scottish sisters.

Illustrations of the original competition designs by Sir Gilbert Scott will be found in Vol. 24 (1873), and of recently-completed towers and spires in our issue of January 2, 1914.

BUILDING LECTURE-ROOMS.

Some useful hints on the construction and arrangement of lecture-rooms for technical schools are given in the recently issued Memorandum of the Board of Education, which we noticed on p. 198 of our issue of February 28. For certain classes, such as those in building commercial subjects or building law subjects, an ordinary class-room will prove adequate. But for all other subjects the instruction is such as to require the use of technical exhibits, demonstration apparatus, specimens, models, diagrams, etc., and the class-rooms will in general need to be specially adapted to this end. Further, in all lecture work on building subjects the students will need to be taking sketches, making simple drawings, or examining models during a lecture, and for these purposes the ordinary narrow sloping desk is not the most suitable. In practice it is found that flat-topped desks or tables are most convenient even for the purposes of class lectures in building. Hence the best arrangement is one under which every building classroom is fitted up so as to serve the purposes of *either* a lecture or a drawing class. This arrangement has the further advantage of simplifying the organisation of a department, for when there is no distinction between lecture-rooms and drawing offices the rooms may be used indiscriminately, and fewer rooms will thus be necessary for the use of a department. The concentration of the work of a department, as suggested above, will, in consequence, be greatly facilitated.

In order to illustrate the arrangement and equipment of a combined lecture and drawing room the plan of an existing room is given in the Memorandum. The room is 27 ft. 6 in. wide, 23 ft. 6 in. long, and 14 ft. high. An extra couple of feet or so would be an advantage in the length, *i.e.*, from front to back of this room, but otherwise it is a very convenient one in its dimensions, all students being near enough to clearly hear the lecturer, to see the drawings and sketches made on the blackboard, and to follow the demonstrations made at the lecturer's table. The windows of the room are carried nearly to the ceiling, and give a good light across the room. Battens on the vacant wall-space provide attachment for diagrams. The floor is covered with cork linoleum which deadens all sound from shuffling feet or stools and minimises dust. The tables or benches are 2 ft. 9 in. high and flat topped. They are very substantially constructed so as to reduce vibration during drawing practice, the faces being made of 2½-in. planks, and the framing of 4-in. by 4-in. quartering. Runners for storage of drawing boards are provided under the table tops, and substantial foot-rails are attached to the framing. The stools which were originally provided have been replaced by short forms, the latter being less liable to be toppled over by careless students, while at the same time they admit of a student so desiring to stand at his work by merely shifting backward his end of the form. The benches are arranged to accommodate a maximum of 36 students for lecture purposes, or 24 students for drawing practice when imperial drawing boards are used. The lecturer's table is 2 ft. 9 in. high and the lecture platform is elevated one foot above the floor. The sliding blackboard is 12 ft. long by 5 ft. 9 in. high, and very substantially constructed. It is hung on 9-in. pulleys, the single counterweight moving in a side boxing. The space behind the blackboard is fitted with shelves, and there are glass cupboards at each side for storage of small models and specimens of materials. Attached to and in front of the lecturer's table are vertical folios, made of 3-ply wood, to hold students' drawings. At the side of the room is a bench for exhibition of large models and there is also an additional rack for drawing boards and T squares.

BUILDING DRAWING OFFICE.

A room of the type described serves the purpose of a drawing office as well as a lecture-room. Sometimes, however, a separate drawing office is desired specially for the use of students engaged in advanced design in connection with which no lectures or demonstrations are provided. The drawing-tables in this case may be single or dual, spaced well apart, and office stools substituted for forms. Such accessories as an electric printing apparatus and washing-trays for blue printing or other copying processes may be accommodated in this room.

In all rooms used for drawing purposes a good system of artificial lighting is important. This should be so arranged that no disturbing shadows are cast on the paper. With a suitable ceiling or with special reflecting shades, excellent results can be obtained by indirect lighting in which only reflected or diffused light reaches the drawing board. A somewhat more economical arrangement is that in which high-candle power incandescent lamps are used either singly or in groups. The dazzling effect of the direct rays of the lamps may be avoided by the use of semi-transparent shades or globes, while reflecting shades fixed above the lamps supply further diffused illumination. Holophane globes or shades, if judiciously selected, may be made to fulfil the same purpose. Where in existing rooms there are incandescent lamps with ordinary opal shades a strikingly improved effect may be obtained by simply inverting the lamp and shade so that the light is reflected from the ceiling. In this case, however, it is essential that the shades should be frequently cleaned, as dust settles on the inverted shade and reduces its reflecting and transmitting capacity.

BUILDING LABORATORY.

General Requirements.—A suitable laboratory is an essential feature of any satisfactory scheme of building education. Steps should be taken, in all cases where no such accommodation is available, either to specially erect a building laboratory or to make the necessary adaptation for that purpose of an existing room.

For the work of a senior course an appropriate size for the laboratory is about 1,200 square feet. In a small school, where considerations of space are very important, and where the class numbers less than twenty students, useful work may, however, be done in a laboratory that is not more than 800 square feet. Preferably the laboratory should be located on the ground floor on account of convenience for the drainage and sanitary experimental work. It is, however, an advantage to have the room contiguous to the building construction lecture-rooms. The laboratory floor should be of hard, impervious material, and the finish of the wall surfaces as simple as possible. If the walls are of brick, a neat pointing only gives a very suitable finish. The height of the room on at least one side should be not less than 12 ft. in order to permit of the erection of complete hot-water circulation and drainage apparatus, etc. It is desirable that on this side there should be a minimum of window space so as to afford space and freedom for the erection of the necessary pipes, cisterns, etc.

Roughly speaking, about one-third of the floor space should be allocated to that experimental work which is likely to introduce dust and dirt, and for which the use of considerable quantities of water is necessary. Such experiments are those related to the investigation of limes, cements, stones, etc. The space for this work will usually be at one end of the laboratory, where there will be a suitable arrangement of slate benches, sinks, etc. The room may be so arranged that it can be used for ordinary class work, as well as for experiments, and must be pro-

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vided with a blackboard. The tables should have plain flat tops; they should be firm, but not too heavy or too long to be easily moved; they need not be very wide. Small bracket tables attached to the walls are useful for students to write up their notes and observations while conducting experiments.

There should be ample cupboard room, but this should be provided with the least possible sacrifice of wall space. One or more smoke flues should be provided. There should be ample gas and water supply, the latter in sufficient quantity to conduct experiments on flushing and syphonage appliances and devices. Good connections to drains for drainage experiments should be made (a manhole may be built in the room), and gully traps should be arranged to intercept plaster and cement residue.

The lighting of the laboratory is important, seeing that exact observations have to be made in a variety of positions. An absence of shadows is important, and can be secured by good diffusion of the light, as described in connection with the Drawing Office.

INDUSTRIAL HOUSING FOR THE THREE POUND A WEEK MAN.

Mr. Lawrence Veiller, the Secretary of the National Housing Association, New York City, writing in the *American Architect*, says:—When it comes to the question of housing the unskilled labourer earning on an average $15 a week, we find that there is a housing problem, and that there are many questions that require the most careful consideration. So true is this that many housing reformers feel that it is the only housing problem, and constantly give vent to that feeling by brushing aside the consideration of every other question, saying in effect: "All that is of no moment; but what about the man who earns $15 a week? How are we to house him?"

That he can be housed satisfactorily, and must be so housed, there can be no question. That he is not housed satisfactorily to-day is equally obvious.

Most of us would like to see this type of worker living in as fine a house, with as much space, as many rooms, with all the conveniences, and in the same type of single-family detached dwelling, as the higher-paid skilled worker can afford.

Of course, this cannot be done. The man of low earning capacity can no more afford to buy the best quality of housing than he can afford to buy the best quality of food or milk or clothing, or any other commodity. It would be as reasonable to expect him to be able to afford certified milk at 22 cents a quart as it would be to expect him to afford the detached cottage of the skilled mechanic. Some of us, I regret to say, are inclined to lose sight of this fundamental economic law.

If, then, the unskilled worker cannot be housed in a single-family detached cottage such as his more fortunate co-labourer can afford, the question arises, "What is the type of house that he can afford, and what is the best type of house to place at his disposal?"

In some communities, I regret to say that they have answered this question by providing the multiple dwelling, and house the unskilled workers in huge barracks or tenements, or in the objectionable "three-decker." It has never occurred to them, apparently, that there were any types but these two—the detached single family cottage or the tenement.

There is, however, a very excellent type of dwelling that is suited to the man of low earning capacity, and that is the single-family dwelling built in rows or groups, what in some parts of the country is known as a "terrace."

THE ROW OR GROUP HOUSE.

This type of house is the common type of working-man's dwelling, in fact, one may say the universal type, in Great Britain. Where land values are high, where building is costly, and especially where it is necessary to keep down the rent to $15 a month, this is the only type of single-family dwelling in most parts of the country—of course, there are some parts of the country where an exception should be made—that can be built and can be rented at this figure, and at the same time return a fair return upon the money invested.

One of the great mistakes we have made in attempting to house this type of worker has been to neglect all considerations of how much land this worker can afford to pay for. In most communities where they have been dividing their property into lots of 25 ft., 40 ft., and 50 ft. frontage, with depths varying anywhere from 100 to 150 or 200 ft.—a type of subdivision excellent for men of means, and in some cases entirely appropriate even for the skilled mechanic, but quite inappropriate for the man we are now considering—they have gone on and, without thought, have assumed that the working man earning $15 a week should build a house upon property of this type.

The working man of low earning capacity can no more afford to pay for more land or more house than he can afford to use than he can afford to pay for more clothes or more food than he can afford to use. The $15 a week man does not need a house 25 ft. wide, nor can he afford it

I realise that there will be considerable dissent from this statement, and that to many it will come as a new suggestion, and, like all new ideas, will be keenly resented at first. But students of the problem are quite agreed on this point, and find that the best type of house for this kind of working man is a house of about 15 ft. or 16 ft. frontage, two stories high, built in a row or group, containing not more than five rooms and bath, and preferably not more than four rooms, with two living rooms on the ground floor, and a bath and two or three bedrooms, as the case may be, on the second floor.

Such a house is best exemplified in the ordinary commercially-built Philadelphia house, built literally by the hundred thousand in that great city, serving as the habitation of over a million people. In speaking of the Philadelphia house, there are two types which should be distinguished. What is referred to here is the four-room house, and not the more recent type of development, a house with six rooms with an extension on the ground floor.

It is an axiom in housing that no house is "model" that exceeds two rooms in depth. In fact, in Great Britain a house deeper than this is practically unknown. It could not be rented or sold.

HOW MANY ROOMS?

How many rooms can the $15 a week man afford to pay for? How many does he want?

This raises a host of novel questions, I appreciate. The writer has personally had this question borne in upon him with considerable emphasis recently through the study of the trend of development in the housing of certain portions of the population of one of our large Eastern cities, where the trend toward a smaller number of rooms has been strikingly noticeable in recent years.

In seeking the causes for that trend it has developed that the average working man of this type cannot afford to occupy more than four rooms, and that usually when he rents or pays for more than four rooms he does not occupy them all, but supplements his income by taking in lodgers or boarders.

It was also discovered that he cannot afford to heat more than four rooms; that his wife, as a rule, especially in these days, with the distractions of moving pictures and other phases of city life, does not wish to take care of more than four rooms. Finally, the furnishing or equipment of more than four rooms proves a burden. Of course, in exceptional cases, where there are very large families, four rooms are not sufficient. These, however, are the exceptional cases, and not the rule.

If one can gauge accurately the present trend of social development, families are likely in the future to continue to grow smaller, and to need fewer rooms.

A house of the type we have described can be built complete with outer walls of brick, with cellar, furnace, running water, and all modern improvements, even in some cases including electric light fixtures, and sold, including the land and improvements, such as curbing, paving, and grading, for $2,000, and can be rented without difficulty for $15 a month, and yield a commercial return. This is what is done in the city of Philadelphia. It is made feasible there by operating on a wholesale scale and building many houses at once.

It is also made possible through the more intensive use of the land which the smaller size lot lends itself to. It is thus possible to get a great many more houses on the same area of land than in the case where a larger unit is employed; and, of course, the cost of the smaller house is also considerably less than that of the larger house.

This is the type of house which has been developed very successfully in a number of so-called "model" dwelling enterprises.

USE OF NATIVE TIMBER.

A special meeting, convened by the English Forestry Association, was held on Monday at the Surveyors' Institute to consider the situation with regard to native timber supplies in view of the Prime Minister's recent statement. Mr. Lloyd George, it will be remembered, observed that in no branch of our national activity could so much tonnage be saved as in the cutting-down of timber. Major G. L. Courthope, M.P., presided, and briefly introduced Sir Bampfylde Fuller, who, he explained, had taken over the Department dealing with Home-grown Timber.

Major Sir Bampfylde Fuller confessed his ignorance of forestry matters in England and also that he was not a free lance. He had to act under the instructions of the Secretary of State. They aimed simply at restricting the imports of timber, which amounted to six million tons, and if they could cut that tonnage down, in favour of food and materials for munitions, they would be doing good service. There were only four or five months' supplies left, and they desired to make the stocks last longer. He asked those present to go back as missionaries and lend their influence against indiscriminate and extravagant use of timber. Reinforced concrete must be employed instead. Packing cases must be dispensed with as much as possible. Waste of timber just now would be a scandal. (Hear, hear.) It might be said that the Army wasted most timber—(hear, hear)—but the most stringent steps were now being taken to reduce it. In order to produce pit props for the use of the country they would require between 12,000 and 14,000 men, and for other purposes between 60,000 and 70,000 men. To secure that labour they were importing white labour from other countries, and especially from the Overseas Dominions. Newfoundland, for instance, and Canada were providing many lumbermen. The work of cutting would be supervised by trained forestry experts, who would act as officers. There would be an Advisory Committee, representing landowners' interests, and they were not going to make a desert of "this green and pleasant land." He hoped for much from private enterprise in increasing the supply of timber. He had secured the exemption of all men engaged in the cutting, transport, etc., of timber who were over twenty-five and not in Class A.

Mr. Harling Turner, Agricultural Director of National Service, said they would try to supply 10,000 men for the use of those dealing with timber. They could not find expert foresters, but those at the meeting could do so, and set them to train the battalions of unskilled men that the National Service Department would be able to supply. He suggested that those men should be paid the minimum of 25s. while being trained, and after that the usual rates, or, better still, by piecework. (Hear, hear.) He would do all he could to assist any private arrangement between landowners and pit proprietors.

Sir Ivor Herbert remarked that they could find the labour and carry it through if they could be protected from the demands of other Government Departments for men.

UTILISATION OF WATERWAYS.

The Earl of Ancaster suggested the use of the rivers to float down timber, especially in Scotland. He objected to the way the foresters were being called up time after time when they had been exempted, wasting days of labour.

Sir Bampfylde Fuller said he would look into the question of waterways. He acknow-

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ledged the great waste of time caused by the military tribunals, but apparently nothing could be done.

Mr. H. Elwes said that enormous quantities of timber were lying ready for use for which no transport could be obtained and no skilled labour to handle it.

Mr. Dipscombe (Land Agents' Society) expressed the hope that in the future landowners who were engaged in forestry would have some guarantee that they would not grow timber at a loss.

Mr. Harling Turner asked if women could be profitably employed in pit prop cutting; and the Chairman replied that in his experience women were most successful in forestry work, especially in top cutting.

It was arranged to organise in every way possible to meet the requirements of Sir Bampfylde Fuller.

CHARING CROSS BRIDGE.

The following appeared in the daily papers yesterday. The matter came before the House of Commons last night, too late for us to report. We hope common sense prevailed—a vain hope, perhaps, nowadays as far as the House of Commons is concerned—if not, that the Lords may again do their duty:—

To-morrow evening the second reading of the Bill promoted by the South-Eastern and London, Chatham, and Dover Railways will be moved in the House of Commons. This Bill is practically the same as the one rejected in the House by a large majority last year. It asks for powers to strengthen a portion of the bridge, involving the use of a very large amount of steel and labour urgently required for war purposes, while, incidentally, it would obstruct the carrying out of a much-needed public improvement. We venture to hope that no such powers as those asked for will be granted to the company in war time or until the whole question can be fully and carefully considered.—Yours, etc,

REGINALD T. BLOMFIELD, R.A.
JOHN BURNS, M.P.
ERNEST NEWTON, A.R.A., President, Royal Institute of British Architects.
ASTON WEBB, R.A., Chairman of Council, London Society.
19, Queen Anne's Gate, Westminster, March 12.

TRADE NOTES.

Boyle's latest patent "Air-Pump" ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, E.C., have been employed at the Power House, Blaydon Burn Colliery, Blaydon-on-Tyne.

The Willesden Paper and Canvas Works, Ltd., whose premises were destroyed by fire in July last, have now rebuilt their factory, and have resumed business at their new works, Willesden Junction, N.W.

Mr. A. C. J. Green has resigned his position with Messrs. F. McNeill and Co., Ltd., and has taken charge of the British Roofing Co., Ltd., 126, Bishopsgate Street, E.C. 2. One of the specialities of the company is "Alligator Roofing," for which inquiries are solicited for immediate delivery. They also specialise in asbestos roofs and damp courses.

Cement finishings to concrete flat roofs are being increasingly adopted in many parts of the world. Perhaps one reason for their being favourably regarded is because experts are not necessary to lay them over the reinforced concrete. We learn that the roof to the Sergeants' Quarters at Charbagh, India, has been given a 1½ in. Pudloed cement topping, and the Garrison Engineer, Lucknow, has expressed his satisfaction with same. In hot climates like India cement toppings to roofs are unaffected by the intense heat when they are covered with gravel, coke breeze, small shells, or other loose materials to counteract the fierce rays of the sun.

Mr. B. J. Fletcher (water-colours) and Mr. Joshua Smith (miniatures) have been elected members of the Royal Society of British Artists. There were fourteen candidates.

By order of Lieutenant-General Sir Francis Lloyd, commanding the London District, the Grafton Galleries, Grafton Street, London, W., are placed out of bounds for all troops from this date.

Correspondence.

ARCHITECTS AND NATIONAL SERVICE.

To the Editor of the BUILDING NEWS.

SIR,—I should feel obliged if you would grant me space in your columns for a few lines on National Service. I think there is no question that the architectural profession as a whole has been more hit in this war than any other; we were closed "by order," our contracts were limited to below £500 each, and so far I have never heard a grumble. I do not now propose to break this good record, but I do wish some guidance in what should be done with regard to National Service.

I understood the architects were to prepare plans for buildings to be started after the war. This seemed to me a very excellent suggestion, and we immediately set to work and persuaded our clients to allow the drawings to be started. So far we have instructions for about £50,000, and more in prospect. As these plans cannot be prepared in a few days or by myself and partner, we decided that, as the war was likely to last for another twelve months, we should not employ any outside help, but do the work ourselves. I may say that our pre-war staff have all joined up, including three assistants, two pupils, and one surveyor, leaving us with clear boards; but, at the same time, I should state that we have a considerable amount of work going on which is unfinished owing to slow progress since the war started, and we have this to superintend and complete. So from the foregoing it will be seen that our hands are full. My partner is a driver in the V.A.D., and is often called away from business, and he has a good deal of all-night work. I live too far away to be of any use in this direction.

Having given the above facts, I should be glad to know if we should continue as we are or should we close the office, sell the furniture, and take up something under National Service? It is clear that we could not keep on the office, as the rent and rates would exceed the wage offered under National Service, and our families must live somewhere, and they must be fed.

Perhaps the President of the Royal Institute of Architects would give us his opinion, as he has done great service to the profession in his official capacity under the Ministry of Munitions, and the profession owe him a debt of gratitude for what he has done on their behalf.—Yours, etc.,

"TWENTY-FIVE YEARS IN PRACTICE."
Newcastle-on-Tyne.

PROFESSIONAL AND TRADE SOCIETIES.

THE ARCHITECTURE OF BIRMINGHAM.—A paper was read at the last meeting of the Birmingham Architectural Association, at the rooms of the Society of Artists, by Mr. Gerald McMichael, on "Architects and Idealism." He said that in Birmingham architects were trying to fix a new ideal, the control of the design of city architecture. He believed it could be done and should be done, but it would have to be done in a reasonable spirit of give and take. They must endeavour to impress upon those in authority that their ideal was a real live thing, that as citizens who had studied the matter they had a reasonable right to be consulted in all that really affected the beauty of the city, and that that right rested upon the definite fact that they were qualified to express an opinion which should carry weight and which should be considered. He hoped a committee to deal with architectural design would be set up at once. If such a scheme were possible in Brussels it should be equally possible in Birmingham. In Brussels the municipality made a grant when necessary for the improvement of the design, and strict rules were enforced to ensure the design being in keeping with the rest of the work. What an excellent arrangement that would be for Birmingham. The committee, composed of architects and laymen, working in conjunction with the Architectural Association, might do much useful work not only as regarded the design of new buildings, but also as regarded the general beauty of the city. He had noticed with feelings of regret that in the older portion of Edgbaston, when the leases fell in, modern structures of the pretty type were being erected, but they were out of keeping with the surroundings and a serious blot on the suburb. Edgbaston had a tradition in houses which was quite pleasant, and he saw no reason why that type should not be continued. Too many of the general public seemed to think that the functions of an architect were to look after the drains and play the policeman over the builder. It was time the public understood the architects had ideals, and that they wished to express in their work something of that idealism which was shown in the work handed down to them, and to which countless men and women turned to-day for refreshment and inspiration.

THE LONDON SOCIETY.—The fifth annual general meeting was held at the Surveyors' Institution last night at 5.30 p.m. The balance-sheet of the Society was submitted, Lord Plymouth in the chair on this occasion. Sir Aston Webb and others spoke. The Society's object in the preparation of the development plan of Greater London, which is now complete, was described, and a general account of the Society's work given. The Council for the ensuing year was elected.

SCOTTISH ARTS CLUB AND OVERHEAD WIRES.—A discussion on overhead wires for Edinburgh cars took place at the annual meeting of the Scottish Arts Club, on a communication on the subject from the Cockburn Association. Mr. G. Ogilvy Reid, R.S.A., the president of the club, was in the chair. Mr. James Paterson, R.S.A., moved that the Scottish Arts Club express their sympathy with the opposition to overhead traction in the streets of Edinburgh. He had never seen any tramcar, he observed, that was not hideous; and he advocated motor-buses as an alternative.—Mr. W. D. M'Kay, R.S.A., seconded.—Mr. J. Hogben observed that he did not think it was beyond the reach of artistic design and effort to provide a system of overhead wires free from objection.—Dr. Cattanach moved the previous question, which, on a vote, was defeated. An amendment was moved and seconded—"that, in view of the important interests involved, affecting the convenience of the citizens and economic and civic development, the Scottish Arts Club declines to make any pronouncement against overhead tramway wires."—Mr. H. W. Kerr, R.S.A., remarked that the noise of the cars was something which ought to be remedied. A further amendment, that the matter should be remitted to the council for consideration, was moved, and on a vote was carried by 13 votes to 11 for the first amendment. This amendment was then carried by 19 votes to 4 against the original motion by Mr. Paterson.

SURVEYORS' AND AUCTIONEERS' CLERKS.—The annual meeting of the Surveyors' and Auctioneers' Clerks' Association was held last Wednesday evening at the Mart, Mr. Henry W. Bilby presiding. The chairman briefly reviewed the annual report, and spoke with regret of the death of Mr. Oscar Tyrrell, Capt. Dickinson and Mr. W. B. Rogers. He mentioned that the outgoings would seemingly be quite as heavy next year, as they were just paying out £100 life assurance, whilst eleven sick allowance claims were being considered. They might, however, congratulate themselves upon the fact that the subscriptions were well maintained, and although the honorary subscriptions dropped a little he thought they should be very grateful to those who continued to support them. Mr. Edwin Fox was re-elected treasurer, Mr. Geo. Coleman as auditor, and Mr. F. R. S. Pilcher as hon. secretary.

As the result of negotiations with the employers, the Stonemasons' Society has secured advances for the Cornish granite quarrymen of from 5s. to 6s. per week.

Broadstairs Council has been asked by the Local Government Board to make formal application for sanction to a loan for work which it wishes to put in hand on the termination of the war. The council proposes to drain a new area of the district at a probable cost of £50,000.

PARLIAMENTARY NOTES.

TIMBER FOR THE ARMY.—The Earl of Selborne asked last Wednesday why the War Office had taken over the work of the Home-grown Timber Supply Committee, and why that committee had been dissolved. The Earl of Derby said the staff and operations of the Home-grown Timber Committee had been placed under the general control of the Director of Timber Supplies upon the recommendation of Sir H. Babington Smith's Committee because it was necessary to adapt importation to our restricted tonnage. The transfer was decided upon by the War Cabinet, Mr. Prothero consenting. The reasons for the change were that the Army was by far the largest consumer of timber, and the amount which went to France was stupendous. The great difficulty with regard to timber was labour, and if there was difficulty in getting labour the War Office would be held to blame. Lord Lovat had taken a position on the staff of Sir Douglas Haig to control the vast forestry operations in France. The French Government had placed at the disposal of the British Army huge tracts of forest, and with a proper supply of labour it would be possible to obtain from this source much timber which had formerly to be brought from over seas. That would reduce enormously the tonnage used for the carriage of timber. He hoped the new arrangement would increase the timber supply, but it would be absolutely necessary to economise in the use of timber. It might be necessary before long to enforce strict economy by the issue of hard and fast regulations.

NEW NEWSPAPERS.—Colonel Gretton (U., Rutland) asked the Home Secretary, last Thursday, if his attention had been called to the establishment of a new Sunday newspaper in London; if he could state by whom it was owned and financed; and if, in view of the shortage of paper for the use of the existing Press, there was any power of stopping the establishment of new newspapers at the present time.—Mr. G. Roberts (Parliamentary Secretary, Board of Trade): I have no information as to the ownership of this paper. There is no prohibition in force against the establishment of new papers.—Mr. Watt (L., Glasgow, College): Will the hon. gentleman say why this newspaper is subsidised by Government advertisements, whether the editor is a Hungarian, and whether he receives the confidential communications of the Government?—The Deputy Speaker said that notice should be given of such questions.—Sir W. Byles (L., Salford, North): Is it true that a member of the Government is interested in this paper?—No answer was returned.

As a permanent war memorial, the vicar and wardens of the Parish Church, Aldershot, have agreed to the erection of two almshouses, and are endeavouring to raise funds for the purpose.

The death has taken place at Coventry, where he had worked in a munition factory for the last two years, of Mr. George Frederick Stephenson, for many years an architect at Harrogate.

Day and night nurseries have been opened in Willesden for the children of munition workers. Attached to these nurseries are kitchen and larder, dining, bath, and linen rooms, and a large playground.

A memorial tablet to the late Edwin Austin Abbey, R.A., designed by Mr. Alfred Parsons, R.A., which has been placed in the crypt of St. Paul's Cathedral, was unveiled by Princess Louise, Duchess of Argyll.

At the City of London School last Wednesday afternoon Mr. Banister F. Fletcher was presented with his portrait in oils, painted by Mr. Seymour Lucas, R.A., in appreciation of his services for two years as chairman of the managing committee.

The architect to the East Ham Education Committee has been instructed to complete plans for converting the infants' department of the school in High Street into a special centre for mentally defective children, and also the plans for a mixed school for 600 children.

In view of the difficulty of obtaining supplies of special types of water taps, the Ministry of Munitions recommends all water engineers to relax their regulations for the time being, and to accept any effective substitute for the particular type of fitting they usually require.

The Paisley Town Planning Committee have instructed Mr. Lee to prepare a plan showing what area he considers should be laid out on town planning lines, and submit same to a future meeting. They also consider that it would be advisable to prepare a scheme of houses to be erected after the war.

Our Office Table.

A scheme designed to save labour in the Post Office has come into operation. London is subdivided into the areas designated by the letters W., W.C., S.W., N.W., E., S.E., and E.C.; but in future every one of these areas will be further subdivided by numbers attached to the principal streets. For instance, the address of our own office will be Effingham House, Arundel Street, Strand, London W.C. 2, the figure 2 indicating the district of the W.C. area in which our part of the Strand is situated. This is an improvement upon the scheme which has been in operation in Paris for some time. There the areas are numbered, but there is apparently no subdivision, as is now proposed in London. The new arrangement will ensure quicker delivery, and we shall be glad if all correspondents will make a note of this when sending communications to us.

At the last meeting of the Wharfedale Rural District Council at Otley, Mr. A. Tankard, of Pool, pointed out that the plumber in his village had been denied the renewal of his petrol licence. The only use to which he put the petrol was in a lamp for the repair of water-pipes. The result was that no pipes could be repaired, a large quantity of water was running to waste, and the public generally were put to a good deal of inconvenience. All the man wanted was about a gallon of petrol per month. — Mr. A. B. Bonwell (Ilkley): It is an abominable thing that people of this kind cannot have small quantities of petrol for their businesses, whilst others can go on frivolous errands whenever they think fit. —It was decided to instruct the clerk to write to the Petrol Control Board on the matter.

Among the witnesses examined by the Indian Public Works Department Committee during its Calcutta sitting on February 2 was Mr. Henry A. Crouch, consulting architect to the Government of Bengal, who said that it would be possible to obtain better buildings if it would be practicable for all important buildings to be designed and their construction superintended by trained architects. A large architectural establishment was, he said, necessary to permit of proper inspection of works in progress. No satisfactory provision was made for teaching architecture in the Calcutta School of Arts. There was a class for architectural drawing in the Sibpur College, but there was no special class for teaching architecture. He would recommend that there should be a specialised course in architecture at Sibpur. His suggestion was that a separate school for architects should be established in Bengal. India was not a suitable field for recruitment of architects; they ought to be recruited in England.

Sir Frank Short's lecture on "Mezzotints" was the last of the series at Burlington House in connection with the Winter Exhibition of Graphic Art. It sketched the history of mezzotint engraving from its invention by Ludwig von Siegen through the three stages of precursors, the blossoming time, and the decline in mixed methods, the lecturer meanwhile explaining by diagrams the processes by which the plate is rocked and scraped. Examples of eighteenth century Masters were thrown upon the screen, followed by others illustrating the work of Turner, which gave occasion for the interesting comment of a practitioner on the use of mezzotint, aquatint, and etching in combination. Two points made by Sir Frank Short were the negation from experience of the prejudice against the steel-face and the field still presented by landscape for mezzotint in the future.

The whole of the houses at Binnend village, Burntisland, have been taken over by the Admiralty to provide accommodation for men and their families in connection with the Rosyth Dockyard. There are 118 houses in the village, and these will provide habitations for between 500 and 1,000 people. Since the closing of Burntisland oilworks a number of years ago, the houses at Binnend have been tenanted chiefly by Edinburgh families, who used the houses as summer quarters, the dwellings, under the conditions of their leases, being closed during the winter months, except at week-ends. In the village is a school, formerly under the Landward School Board, but in recent years closed, accommodation in the burgh schools being deemed sufficient for the needs of the parish. A considerable outlay will be necessary to put the school buildings in proper condition should they be required.

The ancient parish church of Wilne, near Derby, was destroyed by fire last Wednesday. Practically the only parts saved were the tower and the Willoughby Chapel, containing monuments to the Willoughby family, of Risley, one of whom was the first Arctic explorer and perished on an expedition in the time of Queen Elizabeth. The church contained what is thought by some to be the oldest font in the country. It was part of a Saxon circular column or cross, work of the ninth, or even the eighth, century, which had been hollowed out at an early period. The fabric of the church was mainly of the fourteenth century, but the lower stage of the tower dates back to the thirteenth.

The principal causes for decay in building timbers, according to the *Canadian Engineer*, fall, roughly, under the six following heads: (1) Placing non-durable timber in moist, ill-ventilated basements or enclosures beneath the first floor, or laying sills in direct contact with the ground. (2) Embedding girders and joists in brick or concrete without boxing the ends. (3) Placing laminated flooring in unheated buildings in a green or wet condition. (4) Covering girders, posts, or laminated flooring with plaster or similar coating before being thoroughly dried. (5) General use of non-durable grades of timber in a green or only partially seasoned condition. (6) Use of even dry timber of low natural durability in buildings artificially humidified to a high degree, as in textile mills. A further element of danger lies in the use of timber infected during storage, or which has become infected through neglect after purchase and delivery.

At the annual meeting last Thursday of the Liverpool and North Wales District Branch of the Auctioneers' and Estate Agents' Institute a short discussion ensued on the prohibition of poster advertisements.—Mr. Robert Manley (Nantwich) said the posters could be dispensed with, as the "effective advertising was done through the newspapers."—Mr. Bradwell (Nottingham, president of the institute) agreed with Mr. Manley. His own firm discarded posters a year ago, and they had never had a bad sale. He inserted a notice in the newspapers stating that he had discontinued posters, which he had found to be a cheap advertisement for the auctioneer but an expensive one for his clients—in fact, money thrown away as far as clients were concerned. The posters attracted only loafers, who were a nuisance to the auctioneer.

When the Bangor City Council were asked last Wednesday week to pass plans of an annexe to the Carnarvonshire and Anglesey Infirmary, Mr. Taylor raised a protest against the action of the committee in not advertising the work and giving local contractors an opportunity of tendering, and in giving the work to an outside contractor.—Mr. Jones Roberts said they need not have given the contract to a Bangor man, but to go to London and Bethesda, without allowing the Bangor builders to tender, was extraordinary. And yet these people were continually begging for subscriptions from these builders, among others.—Dr. J. E. Thomas explained that the committee did not intend to reflect on local builders in not advertising for tenders; but the work was urgent, and the committee felt it was a building that could only be put up quickly by experts in that kind of work, and one or two firms accustomed to do this sort of work throughout the country were written to and asked about the probable cost of erecting a building for twenty patients.—Mr. Jones Roberts moved that the council expresses its regret that the Infirmary Committee did not give local builders a chance to tender for the work. He did not mean that the council regretted that the committee did not give the contract to a Bangor contractor, but they did not give them a chance. The contract was given to a Bethesda man, and

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that man had to come to a Bangor builder to get the timber to do the work with.—Ultimately Mr. Jones Roberts' motion was dropped by consent.

A movement has been inaugurated amongst the manufacturers of firebricks and refractory materials to promote the development of this industry on more scientific lines, and in order to meet any German competition there may be after the war. A meeting promoted by the Refractory Materials Section of the Ceramic Society was held at the Leeds University on Tuesday, when papers were read on "The Clays of Northern and Central Yorkshire," by Prof. Kendall and Mr. Albert Gilligan; and on, "The Use of Zirconia as a Refractory Material," by Mr. J. A. Audley; Mr. B. J. Allen spoke on the processes of manufacturing; Dr. Mellor, of Stoke-on-Trent, gave a paper on magnesite bricks; and Mr. C. Dressler gave an exposition of the "Dressler kiln." In the evening Professor Cobb delivered a public lecture on "Temperature measurement in clay works practice."

The Board of Trade give notice that as and from April 2 the general licences now in existence for the importation of the following articles will be revoked, and that special licences must be obtained for each consignment arriving on or after that date:—Wood.—Beefwood, boxwood, dogwood, greenheart, hickory, lancewood, lignum vitæ, padouk, sabicu, sandalwood, birch timber in logs, i.e., Waney timber, ex Canada, Labrador, and Newfoundland. Wood Manufactures.—Barrels (tops and bottoms for); barrels (wooden hoops for); birch, maple, and persimmon blocks, and squares for bobbins, reels, shuttles, and spools; bobbins, reels, shuttles, and spools; box shooks; box boards; screws made of wood; tool handles, brush handles, painters' (of ash and hickory); case boards; empties returned; flooring boards (planed and prepared, tongued and grooved, of non-prohibited woods); rules, measuring, of wood; oars made from ash wood; pine blocks for match making; plywoods; wooden pulleys; wood wool. Consignments *en route* to this country on or before March 12 will be admitted without licence, and licences will in general be granted for consignments shown to have been paid for by the consignees on or before that date.

Although there is a slight divergence in some of the ancient writers about the precise date, the investigations of the best historical authorities show that Monday last was the 800th anniversary of the laying of the foundation-stone of Peterborough Cathedral. Even then it was the third church upon the site, for the first Abbey of St. Peter, whence the place was called Peterborough instead of the older name of Medeshamsted, was destroyed by the Danes, whose exploit the modern Huns would have rejoiced to repeat if they could have got across. Its successor, which was no doubt largely built of wood in the reign of King Edgar, was burned down in 1116.

For several years past the Board of Education have had under consideration the revision of their regulations for technical schools, etc. Owing to circumstances arising out of the war it was not possible during the last two years to proceed with the matter as quickly as was wished, but a draft of the proposed new regulations has now been prepared, a copy of which can be had for fourpence at the usual Government stationery offices. The general plan of the proposed regulations is explained in the prefatory memorandum to the draft. It will be understood that the dates enclosed in square brackets are only provisional, as the regulations cannot be brought into force until the war is over. In framing this draft the Board have already had the assistance, which they gratefully acknowledge, of much personal and informal suggestion and criticism; they now issue the draft for the information of local education authorities, and in order that they may elicit considered observations and suggestions from them and from other bodies and persons concerned. The present widespread interest in educational matters leads the Board to anticipate much profitable suggestion and criticism from the adoption of this course.

Mr. Henry F. Mence, Surveyor to the St. Albans Rural District Council, writes that he has received instructions, through the Director-General of Military Railways and Roads, to raise, if possible, a company of 250 skilled roadmen, including steam-roller drivers, carpenters, wheelwrights, fitters, bricklayers, and blacksmiths, who will be attached to the Royal Engineers for special road work in France. Mr. Mence states that he is anxious to form a company with a view to taking it out himself. The work necessitates the employment of men who are physically fit and who have been engaged in the trades and work mentioned. Men of military age placed in medical categories "A," "B1," "B2," and "C2," are eligible. The usual separation allowance will be paid, and rations, uniform, and kit will be provided. Special rates of pay are attached to the company to men over military age; pioneer rates are paid to men within military age; and R.E. rates to those experienced in the trades mentioned. Applicants can obtain further particulars from Mr. Mence, 11, St. Peter's Street, St. Albans.

Lord Parmoor, speaking last Monday evening at the Surveyors' Institution, reviewed the history of the Acquisition of Lands Act, referring specially to the modifications introduced in the Upper House. He said he wanted to observe, if he might, on behalf of the House of Lords, that one duty which they could and ought to perform in regard to legislation of that kind was to see that an Act was placed as far as possible under proper drafting and in intelligible language.

Speaking at the Institution of Civil Engineers, Westminster, last Monday night, Mr. Edgar Crammond said that before the war the countries to which Great Britain was exporting capital were increasing their manufactured productions rather more rapidly than agricultural. The consumption of food was overtaking the production, and even if the war had not broken out we were in sight of a severe food shortage. He thought it should be a fundamental principle that British capital invested abroad should be so applied that it had the effect, as far as possible, of increasing our food supply. It was already evident that new conditions had been created by the war, which rendered it necessary that Great Britain should adopt a new economic policy when peace came.

TO ARMS!

1st LONDON ENGINEER VOLUNTEERS.

Headquarters, Balderton Street, Oxford Street, W.

OFFICER FOR THE WEEK.—Platoon Commander H. de P. Birkett.

NEXT FOR DUTY.—Platoon Commander Hughes-Hallett.

APPOINTMENT.—Coy. Sergt.-Maj. Cecil Campbell to be Platoon Commander (dated March 8).

SATURDAY, March 17.—The Parade for Route March will be 2.45, Golder's Green Station.

MONDAY, March 19.—Technical for Platoon No. 9 at Regency Street. Squad and Platoon Drill, Platoon No. 10. Signalling Class. Recruits Drill, 6.30—8.

WEDNESDAY, March 21.—Instructional Class, 8.15. Platoon Drill, No. 1.

THURSDAY, March 22.—Platoon Drill, Platoon No. 7. Ambulance Class by M.O., 6.30.

FRIDAY, March 23.—Technical for Platoon No. 10, Regency Street. Squad and Platoon Drill No. 9. Signalling Class. Recruits Drill, 6.30—8.30.

SATURDAY, March 24.—N.C.O.'s Instruction Class. Captain Castell. Bridging.

SUNDAY, March 25.—Special Work at Bombing School. Parade Clapham Junction Station (City and S.L. Tube Rly.), 9.45 a.m. Uniform, haversacks, water-bottles. Midday rations to be carried.

EASTER TRAINING.—Will be at Esher. Names can still be sent in. Special technical instruction will be given for the first hour to all Platoons on their respective drill nights to prepare for Camp.

MUSKETRY.—For all Companies see Notice at Headquarters.

NOTE.—Unless otherwise indicated, all Drills will take place at Headquarters.

By order,
MACLEOD YEARSLEY,
Captain and Adjutant.

March 18, 1917.

A portrait has been discovered which the Director of the Frans Hals Museum at Haarlem, the General Director of Rijksmuseum, at Amsterdam, Dr. Bredius, and Dr. Hofstede de Groot, believe to be the work of Frans Hals. The picture is in excellent condition, is said to have been painted in 1631, and to represent Van Bredehoff, who is known to have sat to Hals.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

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Solely to economise paper, the price of this journal is now raised to *Sixpence* until the war is over, or till the present scarcity and high price of paper ceases.

If, as at present seems but too probable, further restrictions as to supply are forced upon us, we shall have to diminish its size, but we are loth to do this while enough paper is obtainable, even at loss to ourselves.

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TENDERS.

***** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.**

BATH.—For supply of materials, etc., during ensuing year, for the town council:—

Accepted tenders:—Smith's work, A. Pursey, schedule prices; oils, colours, and painters' materials, J. W. Knight and Sons, schedule prices; plumbing to watering standposts, etc., Holmes and Sons, schedule prices; fine and coarse sea sands, W. Hickery, 9s. per ton; Portland cement, Oxford Portland Cement Co., Ltd., 47s. per ton in 6-ton lots; carpenters' work, G. Morris and Sons, schedule prices; 50,000 elmwood blocks, T. Burgess and Sons, £10 per 1,000.

BEDWAS (MON.).—For the supply of ballast and metalling for road repairs for one year from April 1, for the Bedwas and Machen Urban District Council. Mr. A. S. V. Taylor, Surveyor.

Accepted tenders:—Bedwas Colliery Co., Bedwas, metalling 4s. 6d. per ton. ballast 1s. 3d.; Machen Stone Co., Machen, chippings 8s. 3d. per ton, gravel 8s. 3d.

BROADSTAIRS.—For supply of flints, etc., for the Broadstairs and St. Peters Urban District Council:—

Accepted tenders:—F. Dunn, 20 yards of unbroken flints, 5s. 6d. per yard; J. T. May, Broadstairs, 40 loads of brick rubbish, 4s. 8d. per load.

CHESTERTON (CAMBS.).—For about 5,000 tons of broken granite, for the Chesterton Rural District Council. Mr. J. Dunn, Surveyor:—

Enderby and Stoney Stanton Granite Co., Enderby, Leicester (accepted). Also tendered:—Groby Granite Co. and Lavender and Bateman.

DERBY.—For power station extensions, etc., for the Town Council Electricity Committee:—

Accepted tenders:—E. Morley and Sons, power station extensions, £12,150; J. A. Aiton, Ltd., steam piping, £424; Derby Coal Co., Ltd., T. Walker, G. J. Parr and Sons, and Brookhouse, Johnson, Ltd., coal.

KETTERING.—For the supply of granite, slag, and tar-macadam, delivered in such quantities and at such times as the council shall require and direct, for the Kettering Rural District Council. Mr. J. H. Parker, Surveyor:—

Granite:—Croft Granite, Brick, and Concrete Co., Ltd., Croft, Leicester; Groby Granite Co., Groby, Leicester; Enderby and Stoney Stanton Granite Co., Enderby, Leicester; Mountsorrel Granite Co., near Loughborough.

Slag:—Kettering Iron and Coal Co., Ltd., Kettering; Prestwich and Sons, Dronfield, Sheffield.

Tar-macadam:—Smart and Son, Walsall; Constable, Hart and Co., 41, Eastcheap, London.

LEYLAND (LANCS.).—For water supply works, for the urban district council. Mr. C. J. Lomax, M.I.C.E., 37, Cross Street, Manchester, engineer.

T. Kearsley and Sons, Leigh (accepted)	£5,836 18 5

LONDON, E.C.—For the maintenance of carriageway paving of Holborn Circus, for the Holborn Borough Council:—

Improved Wood Pavement Co., Ltd., 1s. 1d. per super. yard per annum. (Recommended for acceptance.)

MAIDSTONE.—For the reconstruction of the drains at Nos. 29, 31, and 33, Melville Road, for the town council:—

Martin and Newman	£93 3 3
N. Smith	90 10 0
Pearse and Sons	82 0 0
Barney and Son	78 11 6
Cruttenden and Son	78 10 0
W. T. Burrows	77 7 6
W. Bowes (accepted)	73 10 0

NORTHAMPTON.—For repairs and alterations to Bridge Street, for the town council:—

G. W. Souster and Son, £197. (Recommended for acceptance.)

NORTHAMPTON.—For repairs and alterations to park-keeper's house, Abington Park, for the town council:—

W. J. Adkins and Co., £105. (Recommended for acceptance.)

WORTHING.—For painting, etc., on the parade and in the parks, for the town council:—

F. Sandell and Sons (accepted) £362 0 0

LIST OF TENDERS OPEN.

BUILDINGS.

March 29.—Alterations and additions at St. Ishmaels Council schoolhouse.—For the Pembrokeshire Education Authority.—Drawings and specifications may be seen and forms of tender obtained on application to the Clerk of Works, County Education Offices, Haverfordwest, or from the Head Teacher at the Schoolhouse. Tenders to the Clerk to the Education Committee.

ENGINEERING.

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

FENCES AND WALLS.

March 30.—Wrought-iron Gates and Fencing, for the Central Wharf and Quay Street Landing, Auckland, N.Z.—For the Harbour Board.—The Commercial Intelligence Department, 73, Basinghall Street, E.C.

PAINTING.

March 21.—External Painting and Repairs and internal Cleaning at the South-Eastern Ambulance Station, New Cross, S.E., and Repairing and Distempering Ceilings at the Downs Sanatorium, Sutton, Surrey, in accordance with specification prepared by Mr. T. Cooper, M.I.C.E., M.I.M.E., acting Engineer-in-Chief.—For the Metropolitan Asylums Board.—Specifications and forms of tender may be inspected at the Office of the Board, Embankment, E.C. D. Mann, Clerk.

ROADS AND STREETS.

March 16.—Asphalt for footpaths, Portland Cement, Engine Oils, Waste and Packings, etc. (One Year).—For the Felixstowe Urban District Council.—H. Clegg, A.M.I.C.E., Surveyor, Town Hall, Felixstowe.

March 17.—Macadam, Granite Chippings, Limestone Chippings, Granite Setts, Kerbs and Channels, Grit Setts, Concrete Flags, Sand, Tarred Macadam, etc., Ironwork (manhole covers, etc.) (One Year).—For the St. Helens Corporation.—A. W. Bradley, M.I.C.E., Borough Engineer, St. Helens.

March 17.—Broken Slag, Granite and Tar Macadam for roads (One Year).—For the Kiveton Park Rural District Council.—F. Hewitt, Surveyor, Council Offices, Kiveton Park Station, near Sheffield.

March 17.—Road materials (One Year).—For the Horsham Rural District Council.—F. Fraser Haddock, Clerk, 9, Carfax, Horsham.

March 17.—Broken Granite, Broken Slag, Tarred Slag, Tarred Limestone, Concrete Flags, Portland Cement, Pitch and Creosote Oil, Gritstone Setts and Kerbs, Granite Setts and Cast-iron Pipes (One Year).—For the Rotherham Corporation.—C. L. des Forges, Town Clerk, Rotherham.

March 19.—Materials (One Year).—For the Epsom Rural District Council.—A. R. Cotton, Clerk, Gynsdale, Waterloo Road, Epsom.

March 19.—Road materials (Six Months).—For the Wangford Rural District Council.—S. W. Rix, Clerk, Beccles.

March 19.—Supply and delivery of Broken Road Stone, Broken Slag, Granite Kerbs, Granite Setts, Stoneware Pipes, Castings, Workmen's Tools (One Year).—For the Coventry General Works Committee.—J. E. Swindlehurst, City Engineer and Surveyor, Council House, Coventry.

March 19.—Broken Granite, best quality Slag and Broken Flint, as may be required (Ten Months); and Steam Rolling and Scarifying (Ten Months).—For the Braintree Rural District Council.—A. Hills, Clerk, Council Offices, Bocking, Braintree.

March 21.—Broken Granite and Slag (One Year).—For the Hunts County Council.—N. Leete, County Surveyor, Market Place, Huntingdon.

March 22.—Supply of about 2,980 yards of Flints, about 2,550 yards of Granite or other stone, and 60 yards of Gravel.—For the Chailey Rural District Council.—H. Kemp Walls, District Surveyor, North Common, Chailey.

March 24.—Road Metalling in quantities and at times as the Council may desire.—For the Pontardawe Rural District Council.—Forms of tender to be obtained at the Council Offices, Pontardawe. Sealed tenders, Mr. W. Lewis, Clerk.

March 24.—Broken Granite, Tarred Slag, and Hire of Steam Roller (One Year).—For the Dorking Urban District Council.—W. J. Hodges, Clerk, Council Offices, Dorking.

March 30.—Granite, Blast Furnace Slag, Tarred Blast Furnace Slag, Kerbs and Setts, Stoneware Pipes and Gullies, Bricks, Cement and Lime (One Year).—For the Cannock Urban District Council.—R. Blanchard, Engineer and Surveyor, Council Offices, Cannock.

A scheme of sewage disposal for Harrow Weald, estimated to cost £19,000, is to be forwarded by the R.D.C. to the L.G.B. for approval.

Mr. Bert White, of Gisburn, Yorks., has been appointed highway surveyor to the Totnes Rural District Council in the place of Mr. Vickery, resigned.

Second Lieutenant Ralph G. Dyer, R.E., has been killed in action at the age of twenty-three years. He was the second surviving son of Mr. Wm. J. Dyer, surveyor, of 26, Preston Park Avenue, Brighton, and of Blackheath (Messrs. Dyer, Son and Hilton).

Mr. A. J. Codling, elder son of Mr. Alfred J. Codling, of Romford Road, Forest Gate, has been appointed to a second lieutenancy in the Devon (Fortress) Royal Engineers. For several years Mr. Codling, jun., was with Messrs. C. and F. Rutley, surveyors, of 11, Dowgate Hill, E.C.

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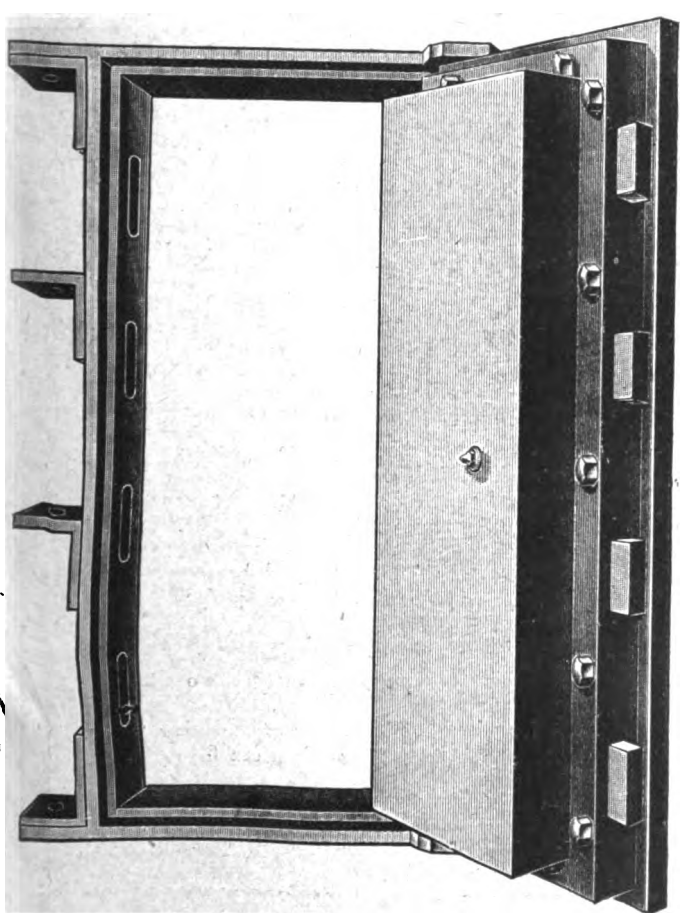

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March 21, 1917. Volume CXII.—No. 3246.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House. Strand, W.C.2.

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OUR ILLUSTRATIONS.

Stockport Grammar School. The Great Hall from the quadrangle, and entrance corridor or cloister. Messrs. Reginald H. Spalding and Ernest G. Theakston, FF.R.I.B.A., Architects.

The Grand Hall, Hotel Meurice, Paris, and the Banque Dreyfus, Rue de la Banque, Paris. M. Henri Paul Nénot, R.I.B.A., Royal Gold Medallist, 1917, Architect.

New Offices of the Department of Education for New South Wales at Sydney. Mr. George McRae, Government Architect.

St. Catherine's Church, Neasden, Middlesex. Mr. J. S. Alder, F.R.I.B.A., Architect.

Currente Calamo.

At his recent reception of the representative deputation of architects Mr. Neville Chamberlain said that he would welcome advice as to the most suitable employment for architects in the National Service Scheme, under which he asked all professional men to enrol, stating that he hoped to deal with such offers on a suitable basis. The deputation has resulted in the formation of an advisory council, which has decided to ask all architects in a position to sign the form to send it in duplicate to the nearest architectural society allied to the Royal Institute of British Architects or to the latter in the case of practitioners in London and the Home districts, so that the whole of these forms may be collected and sent to the National Service Headquarters in the form of a united offer from the whole profession. It is to be hoped that a prompt and extensive response may result from this appeal, and that, at last, offers of help may be appreciatively taken advantage of by the Authority concerned.

We do not suppose that many builders will lay themselves open to the infliction of the heavy penalties levied yesterday week at Bow Street on Messrs. Maple and Co., Limited, and the other defendants in the case reported on another page. We are all hardly hit by the restrictions imposed upon us; but, so far as our knowledge extends, we are all at one with the great majority of the nation, who want to win the war, and are patiently abiding the exceptional sacrifices demanded of us. The only comment we care to offer is a confession of our inability quite to understand why, "without prejudice," permission was given to complete the forbidden work under certain conditions," and then the offenders were prosecuted. In ordinary times we should all probably protest if a burglar were permitted to finish his little job "under certain conditions," and then fined to the tune of a good percentage on the swag. Misinformed people might regard that as a not irresistible temptation to wealthy members of the profession to go and do likewise. The high character and position of all the defendants in the case under notice rather induces the suspicion that they may have been the victims of the misunderstandings which do somehow just now disturb the relations of our somewhat autocratic bureaucrats with the patient public. Anyhow, we are glad the first victim was not some poor tenth-rate builder, whose poverty would doubtless have proved as poor a plea in mitigation of severity as that of the complexity of the regulations advanced by the respective counsel of the defendants concerned in the case quoted.

The second reading of the South-Eastern and London, Chatham, and Dover Railway Company's Bill for the strengthening of the Charing Cross Bridge was carried yesterday week, as we anticipated it would be, by a majority of 184 votes to 56, and referred to a Select Committee, in spite of the complete epitome of unanswerable facts marshalled by Mr. John Burns against it. We hope the opponents of the Bill will not relax their efforts, and that if the vested interests concerned get the Bill through the Commons the House of Lords will once again make an end of it. If it were not so serious a matter, the connivance of the Board of Trade with the efforts of the railway companies concerned to perpetuate a nuisance which revolts every man of common sense and culture would be beneath criticism. As for Mr. Burdett-Coutts' ponderous platitudes, he may rest assured that his "amusement" at the protests of "the artists, æsthetics, poets, and the people who like to be looked upon as combining these three 'things' in themselves," are thoroughly appreciated as admirably representative of the City of Westminster, of which he posed as the spokesman. That intelligent municipality would probably exult in turning Trafalgar Square into a tramway centre, with much the same truculent disdain of the protests of better-natured people exhibited by the vandals of Manchester in regard to the Royal Exchange site in that city, whose contempt for the humanising arts possibly commands the sympathetic admiration of its representative.

We are very glad the President of the Board of Trade proposes to appoint a departmental committee to report what steps should be taken, whether by legislation or otherwise, to ensure that there shall be an adequate and economical supply of electric power for all classes of consumers in the United Kingdom, particularly industries which depend upon a cheap supply of power for their proper development. Mr. G. H. Hume is nominated to represent the L.C.C. on the committee, on the understanding that the Council is in no way committed as to its policy. None of us are, for that matter, but except where vested interests are concerned, we all feel that it is time something was done on the lines proposed by the late Sir William Ramsay to ensure cheap, prompt production of current and its better distribution throughout the country than by coal wagons. Nothing would in greater degree stimulate invention and industry than this, and we are certain that its accomplishment would be a boon of which the magnitude cannot be over-estimated.

According to a correspondent of the *Times*, a 22 acre field of fine young wheat has been seized by the military authorities, who are busily engaged in building huts on it, whereas a field of poor grass across the road would serve their purpose equally well. The story would be incredible if it were not true, and the *Times* has taken steps to verify the facts on the spot. Twenty-two acres of wheat would have fed hundreds of our population for months. Thanks to the publicity thus given to a case which is probably neither typical nor unique, the officials responsible for a wanton piece of stupidity may possibly be prevented from repeating their offence. Quite possibly this is one more instance of the urgent need for proper supervision of buildings by really competent men, instead of by military engineers, who, as we have before pointed out, in their zeal to hurry on jobs, are prodigal of labour and cost, with the result that scamping and waste are inevitable.

The first Royal cremation, that of the Duchess of Connaught, is a welcome proof—if any were needed—that there is nothing in that method of disposing of the dead that need grate on the feelings of the most tender-hearted survivors. Of all our Royal Family the married life of the Duke and Duchess of Connaught has probably been the happiest, as

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it has certainly been the most self-denying, and full of consideration for the welfare of others. It has evoked always the warmest regard of the whole people, and it may well follow that the reverent cremation of the remains of the Royal lady, whose ashes found final rest at Windsor last Monday, will induce a very considerable increase in the numbers of the cremated. Royalty, undoubtedly, can set the fashion in many things; and we believe that the waking up of England in this time of trial has been due in no small degree to the quiet, but marked devotion to duty and willing self-sacrifice of every member of our reigning house, from the King down to its youngest member. That is very much to be thankful for, and history will not forget it, or to record that among other secondary, but yet vital, reforms which marked our age the greatest impetus was given to the substitution of incineration for the costly and insanitary process of burial, especially among the classes most amenable to the lavish and needless expenditure of the ordinary undertaker, by the first Royal cremation.

One "conscientious objector" seems to have taken a leaf out of the builders of "priests' chambers," and other similar hiding-places in the old days of religious and political proscription. Last Wednesday week at the Bristol Police Court George Edgar Barker, 39, cycle agent, of 12, Cannon Street, Bedminster, pleaded not guilty to a charge under the Defence of the Realm Act (Regulation 50), viz., with committing an act prejudicial to the Defence of the Realm Act with intent to assist the enemy. It was stated that prisoner was a conscientious objector and one of violent speech. In September last, when a police officer called at his house, 12, Cannon Street, in search of a conscientious objector, he refused any information as to his whereabouts, and said the Government and Army could go to——. On the 1st inst. Detectives Woods and Wall went to Cannon Street to interview the man. They searched the premises. In a corner of the yard was a well, 20 ft. deep, littered with rubbish. On the rubbish being removed, it was found that 9 ft. down the well, which had been disused for years, and was dry at the bottom, there was an aperture, which led in the form of a passage of 4 ft. into a larger chamber 6 ft. square. Apertures were cut in the well, in which wood was fixed for ascent. In this chamber was an electric bell, connected by means of a wire to defendant's cycle workshop. The chamber was hewn out of the sandstone, and it appeared to have been done at a recent date. Defendant early in the war harboured some absentees, and the last time was some months ago, but there was no one in the well now. Defendant was fined £5, or twenty-six days' imprisonment.

The death occurred at Parkstone, Dorset, on Saturday, of Mr. Horace Wragg, director of Thomas Wragg and Son, pipe manufacturers, of Swadlincote, Burton-on-Trent. His father died a fortnight ago, shortly after Mrs. Wragg's death, and two brothers, Major and Lieutenant Wragg, were killed in France recently.

THE AVONMOUTH HOUSING SCHEME.

A somewhat curious situation has arisen at Bristol in connection with an offer by the present Government to build 500 workmen's houses at Avonmouth, where everybody agrees houses are badly wanted. At the meeting of the City Council yesterday week a report of the Health Committee agreeing to accept the offer was carried at a late hour, and after many members had left the Council Chamber, so we suppose the project will go forward. There are several features in connection with the scheme which deserve attention. It seems to us obvious that the Government, which has stopped building all over the country, recognising at last the present disastrous house shortage everywhere, is itself going to supply the need, in some measure, at the public cost, and try to recoup itself two or three years after the war at the cost of the local authorities. Generally speaking, we see no such need for Government interference. That in special cases it might be judicious we do not deny; but that these are few we are certain. At Avonmouth the immediate result seems likely to be that the Government will simply very partially supply an urgent need which would have been much more adequately met by local effort.

We gather the facts from a report in the *Western Daily Press* of a special meeting of the Bristol Health Committee, the day before that on which the Council meeting was held. It seems that already the local Dockers' Union, brought into touch with the pressing need for more houses at Avonmouth, with the assistance of Alderman Sheppard and a committee, framed a scheme for erecting 1,200 houses with gardens sufficiently large for vegetables to be grown for the family needs. Mr. Napier Miles met the committee in a friendly way, and agreed to give sites for a hall, a church, and a park. The idea was to vest the garden city thus created in a Public Utility Company, in which trade unions, employers, workmen, and others would be shareholders. The intention was to develop the estate on the lines of a garden city. The houses were to stand on plots of ground 40 ft. by 100 ft., and it was felt that if the new community could be housed on these lines it would be a delightful thing from all points of view. The Dockers' Union were starting with £2,000, £1,000 of it from London and £1,000 from Bristol. They had at least 400 or 500 men at Avonmouth prepared to become shareholders in this scheme, and the idea was to form a public utility company in which other bodies and industries could combine to make the project a success from every point of view.

The old Government, and Mr. Walter Long, at the Local Government Board, were sympathetic. The new Government, however, desires the immediate building of 500 houses, and that the Corporation shall take them over after the war. The question accordingly arose at the Council meeting yesterday week: what relation the Government plan would have to the garden city scheme? No one answered the question, and while some of the Council saw the advantage of bringing into play a Public Utility Company, others deprecated the Council tying itself to any such concern. A motion to postpone the discussion was defeated, and the report was adopted.

Mr. Moore, who apparently knows more about building than some of his fellow Councillors, very pertinently asked what was meant by the Corporation taking over the properties from the Government at their market value? Did it mean the worth of the bricks and mortar, or the value based on rental? There was bound to be a loss on the scheme. He was prepared, he said, to build at a loss at Avonmouth because there were other considerations in that case than the rental basis. But the Corporation ought not to do this with their eyes shut. We think Mr. Moore was right, and that the people of Bristol would do well to examine the Government scheme very carefully. So far—as at Well Hall, for instance—the possibly genuinely compulsory activities of the Government may have met present necessities in some fashion, but by and by when thousands of workmen will once again have to leave Woolwich, built as they are the houses will not be much of a bargain to anybody. At Bristol, as far as we can see, private enterprise in connection with a most praiseworthy effort by those chiefly concerned would have built all the houses wanted, and left each of them that best of all investments for the workman's savings—his own house. The Government is only going to build 500, and its proposal seems, so far, to have thrown a red herring across the heretofore clear path of progress those locally interested were pursuing with every prospect of success.

THE ROYAL SOCIETY OF BRITISH ARTISTS.

The 147th exhibition of this Society is really a very creditable one. No less than 203 exhibits testify to the determination of its members to keep things going in spite of present adverse circumstances, and include some works of more than average merit and interest.

The President, Mr. Frank Brangwyn, A.R.A., heads the show with three subjects. "A Venetian Palace" (23) deservedly holds the place of honour; and his two etchings, "The Mosque" (82) and "Cannon Street" (91) are in every way worthy of his reputation—the latter especially.

Mr. Francis Black, A.R.C.A., the secretary, to whose assiduity the Society owes much in these times, sends three: "Autumn on the Conway" (76), "A Welsh Cornfield" (77), and "Caer-Rhün, North Wales" (78)—all pastels, and good ones.

Mr. Hely Smith, the hon. treasurer, is well to the fore with two contributions: "Lighters" (5), a most satisfactory canvas, and a seasonable presentment of "The Gulls of Blackfriars" (130).

The two auditors to the Society are well represented. Mr. Charles Ince's "Sunset on Autumn Floods" (12) is excellent, so is "Kindlers" (38) and "Noonday" (98a) and "A Spring Morning" (135). Mr. Robert Morley sends "An Old Manor House" (41), "In the Wilds of the Highlands" (61), the best of his four; "One of the Pack" (73), and "The Bridge, Bradford-on-Avon" (79).

Mr. W. E. Riley, F.R.I.B.A., has two of his always-welcome sea pieces: "Purbeck Cliff" (123) and St. Alban's Head" (181), and a quiet but very pleasing bit of "Arundel" (129). Mr. Frederick F. Foottet scores well with "Ludlow" (2), "The Madeleine" (9), and two pastels, "The Walls of Chepstow Castle" (79) and "A Study at Chepstow" (80). Mr. H. S. Kortright revives our hopes meteorologically and refreshingly with "Spring Has Come" (20), and none should miss his "Road Across the Marsh" (57). Mr. John Muirhead, R.S.W., has four exhibits, all good, especially "Morning: Near Falaise, Normandy" (21) and "Huntingdon Bridge" (24). Mr. Alex. MacLean's "Fast Falls the Eventide" (26) is attractive, and so is "The Silent Moon" (50). "Unloading Vegetables"

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(34), by Mr. E. A. Cox, is more to our liking than "The Green Dog" (14). Mr. Hall Thorpe's "England" (39) will catch on, and his "Delphiniums" (107) are very charming. Mr. Leonard Richmond's "Exmoor" (56) is satisfactory, but his "A Breezy Day" (7) perhaps appeals to us more attractively. Under the same title, by the way, Mr. Alex Carruthers Gould (7) gives us another embodiment of a similar character, together with a good view of "Windsor Castle" (105) and two other subjects, "Strand-on-the-Green" (137) and "A Surrey Lane" (145). Mr. P. H. Newman's only exhibit, "Gossips: A Quiet Corner in the Ardennes," is an excellent bit of quiet French peasant life.

Mr. W. Walcot sends three of his etchings: "Regent Street" (90), "The Patricians" (93), and a more ambitious but very good "Reminiscence of the Kremlin, Moscow" (152), on which we heartily congratulate him. All will be glad once again to see Mr. A. Wallace Rimington to the fore with "Where Spire and Bastion Meet the Sky" (166), not the least delightful of the many contributions of the picturesque his many admirers always enjoy, and miss when absent.

There is not much sculpture. Three of Auguste Rodin's works are lent by Miss Gwendoline and Miss Margaret Davies: "Eve" (45), "Mozart" (46), and "Victor Hugo" (47). There are also some replicas of a bronze bust of "Lord Kitchener" (48), by Mr. Herbert Binney, who also has a medallion of Miss Brenda Picton (13) in the case of miniatures. Of the other miniatures the best are "Lilies" (1) and "Grief" (4), by Mr. Joshua Smith. Mrs. W. M. N. Brunton has several, the most attractive being "The Empire Builders" (11) and "A Damsel of the Upper Nile" (12).

THE LATE MR. HIPPOLYTE J. BLANC, R.S.A.

We regret to record the death from pneumonia in his seventy-third year of Mr. Hippolyte J. Blanc, R.S.A., J.P., at his residence, The Neuk, Strathearn Place, Edinburgh, on the 12th inst. Mr. Blanc was chiefly associated with ecclesiastical architecture, and several fine examples in Scotland will perpetuate his name. He was entrusted with the erection of the Coates Memorial Church, Paisley, which cost over £110,000, and is one of the finest examples of Gothic churches recently built in Scotland. He was also associated with important works of restoration in connection with Edinburgh Castle, including the Parliament Hall, which has been the scene of many notable incidents in Scottish history, and which housed the first Scottish Parliament. His skill in this interesting department of architectural practice was also displayed in his restoration of the ancient tower in Edinburgh Castle known as the Argyll Tower, now one of the outstanding features of the Castle buildings. One of his most important undertakings was the design and erection of Bangour Asylum for the Edinburgh Parish Council, costing about £230,000. This asylum has in intervening years received widespread attention from public authorities as a notable departure from the older style of institutional building to the village group system. The large series of buildings, with their central offices and various accessories have since the outbreak of the war formed an important centre for the treatment of wounded soldiers.

Mr. Blanc was born and educated in Edinburgh. He was a pupil of the late David Rhind, architect, and he studied in the National Medallist Science and Art Department School, and for a number of years before starting on his own account was chief assistant in the Edinburgh office of H.M. Board of Works. His career has been one of great activity. In addition to the buildings mentioned he was charged with the designing and erection of a number of well-known churches in Edinburgh, among which may be mentioned St. Matthews', St. Margaret's Episcopal Chapel, St. Cuthbert's, Christ Church, Mayfield United Free Church, and West Port United Free Church. Elsewhere in Scotland he designed St. James's Church, Paisley; Broxburn United Free Church, West Kilbride United Free Church, Kirkliston United Free Church, Greenbank United Free Church, Greenock, and other churches in Tain, Broughty Ferry, Perth, Woodend, Invergordon, Lasswade, and Markinch.

Another important department of his work was the designing of mansion houses, of which there are numerous examples throughout the country, including Ferguslie Park, Paisley, and others at Ayr, Southdene, Wick, and Broughty Ferry. In his treatment of business premises he was successful in combining an attractive design with appropriateness in regard to the purpose for which the building was to be used. Instances will be found in the Edinburgh Café Company's premises, the new brewery for Messrs. John Aitchison and Co., and the brewery offices for Messrs. D. and J. M. Bernard, at Georgie. Probably his most recent important work was the New Edinburgh Ladies' College in Queen Street, a portion of which is completed. The fine baths and gymnasium at Dunfermline were built to his plans.

His standing as a Scottish architect was recognised by his appointment as a Royal Commissioner representing Scotland for the International Exhibitions at Brussels, Turin, and Rome.

His abilities were widely recognised, and at various times he acted in important capacities. In 1892 Mr. Blanc was elected an Associate of the Royal Scottish Academy. He became a full Academician in 1896, and for a number of years acted as the hon. treasurer. He was also a Fellow and for some time a member of Council of the Royal Institute of British Architects and an F.S.A. Scot. He was several times elected President of the Edinburgh Architectural Association, and was a prominent member of the Scottish Society of Arts. One of his recreations was the photographing of interesting architectural buildings, and this interest was reflected in the fact that he was for many years president of the Edinburgh Photographic Society. He gained a medal in Edinburgh for design in 1886, and at Paris in 1889. Mr. Blanc was the author of numerous papers and works on architectural art and archæological subjects. He was a member of the Scottish Conservative Club and of the Scottish Arts Club. He is survived by his widow, who is a daughter of Mr. Thomas Shield, of London, and one son, who has been associated with him in business for some years. We gave Mr. Blanc's portrait and some notes on his career in our issue of May 23, 1890. The following illustrations of some of his best known works will be found in our issues named:—Edinburgh Ladies' College, July 25, 1913; King Edward Memorial, Holyrood, August 2, 1912; St. Magnus Cathedral, Kirkwall, October 7, 1910; Carnegie Baths and Gymnasium, Dunfermline, January 23, 1902; Messrs. Jenner's premises, Edinburgh, November 21, 1902; Diploma Drawing, Coates Church, Paisley, January 1, 1897; Christ Church, Morningside, N.B., January 6, 1899; Ferguslie Park, Paisley, May 27, 1892; Mayfield Church, August 17, 1894.

The funeral took place last Wednesday from Christ Church, Morningside, to Warriston Cemetery. Among the organisations represented were the following: Royal Scottish Academy—Sir James Guthrie (president), the Rev. Dr. Wallace Williamson (chaplain), and Mr. W. D. M'Kay (secretary); Monks of St. Giles (of which Order Mr. Blanc was "Father")—Sheriff Guy, Mr. A. P. Melville, W.S., Captain Cattenach, Mr. David MacRitchie, C.A., Mr. Arthur Easterbrook, Dr. Lowe, and Mr. John W. M. Lonev, solicitor; the Scottish Arts Club—Mr. G. Ogilvy Reid, R.S.A. (president), Mr. J. A. Ford (professional vice-president), Mr. A. P. Melville, W.S. (lay vice-president), Messrs. E. A. Walton, *P*.R.S.W., R.S.A., J. B. Dunn, F.R.I.B.A.; Charles H. Turnbull, S.S.C.; H. S. Gamley, A.R.S.A.; John Hogben, and A. W. Lowe, solicitor, secretary of the club; Edinburgh Architectural Association—Mr. A. Lorne Campbell, F.R.I.B.A., and Mr. James Kerr, F.R.S. (hon. secretary). Others present were Professor Symington, Belfast; Mr. Arthur Giles, Dr. Ronaldson, and Lieutenant Louis Blanc, R.E., Mr. T. Forbes Maclennan, A.R.I.B.A., president of the Edinburgh Architectural Association, representing the Royal Institute of British Architects, London.

STRUCTURAL DESIGN.

Mr. C. G. D. Burdett lectured on Friday, February 23, before the Junior Institution of Engineers, on "Structural Design." After a few remarks as to theory *versus* practice—the pure theorist being liable to design elaborate and costly structures, while the practical man must have some theory as a basis for his work—the author passed on to specific structural details, points to be observed and practice to be avoided. By the aid of the blackboard he dealt with such details as:—Uniform pressure upon footings to be obtained as nearly as possible. The usually accepted formula for load over "lintels" as being equal to weight of brickwork contained within an equilateral triangle whose bases equal span of opening was discussed and shown to be open to question. Disposition of rivets and gusset-plate connecting members of roof trusses, bridge girders, etc. Rivets, he held, should not be put in tension, and should always have plenty of metal in them before closing, to form a good, full head; a short rivet allows the hydraulic riveting "set" to bite the plate around the rivet head, and consequently weakens the plate.

The practice of jobbing builders, or, as one member remarked, "building jobbers," of securing an H column by only two plain cleats at the web to the baseplate, was condemned. The proper method, the lecturer said, should be to rivet reinforcing plates and cleats to the flanges. An airhole should be drilled in the baseplate to avoid the possibility of air being trapped between it and the concrete footing when grouting in, thus preventing the load from being evenly distributed. Continuous beams were not in favour, as unknown stresses were liable, due to any settlement of individual supports. It was easier, and probably cheaper in the long run, to use, say, three 10-ft. lengths rather than one 30-ft. length.

The question of wind pressure was also discussed. After the collapse of the Tay Bridge experiments on wind pressures were carried out, and as a result 56 lb. per square foot was allowed on structures. This was afterwards reduced to 30 lb., the value now taken. In Germany 26 lb., in the United States of America 20 to 25 lb. is taken. A series of experiments made a few years ago was cited. These were conducted on a shed with artificial wind pressure, and it was found that a "pressure bolster" existed on the windward side and a "suction bolster" on the lee side in the triangular space formed by the shed side, a certain distance out along the ground, and the underside of the main air current, the air current sweeping up, over, and down the other side in stream-like fashion. In the course of the discussion one member quoted the highest record of the Meteorological Office for wind pressure as 23 lb. per square foot, steadily sustained for one hour. This was registered at Fleetwood.

The Board of Trade have confirmed the following Order, made by the Light Railway Commissioners:—Axholme Joint Railway (Hatfield Moor Extension Light Railway Revival of Powers) Order, 1917, reviving the powers granted by the Axholme Joint Railway (Hatfield Moor Extension Light Railway) Order, 1910, for the compulsory purchase of lands and for the construction, completion, and working of the railway and works authorised and for other purposes.

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THE PERFECT DWELLING AT LAST."

Under the above title the *Housing Journal*, the organ of the Workmen's National Housing Council, offers some sensible remarks on the present position of the housing question, so far as the workers are concerned. It very rightly condemns, in the first place, the total absence of systematic ventilation in all such, and points out that it is important to note that, while no practicable increase in the size of the apartments of a dwelling can ever compensate for the lack of an adequate system of ventilation, such a system can very effectively make good any shortage of air space due to the smallness of an apartment. For example, a small bedroom with an active exhaust flue and good air supply is vastly "healthier" than a large one without. It then proceeds to dissect the "authoritative examples" of suggested healthy dwellings available in the two extensive collections of cottage designs put forward by the departmental and advisory committees appointed by Mr. Runciman, when President of the Board of Agriculture. These plans, as our readers know, have been employed as the official basis from which to prepare those which are necessary to illustrate the development of existing types leading up to the evolution of the new class. These plans will, therefore, be employed as the basis from which to proceed in evolving the series of elementary plans with which to illustrate the futile character of the planning of cottages of existing types, and to enable the characteristic features and some of the many advantages of the new class to be both clearly demonstrated and easily understood.

"Trusting to the authority of eminent architects," says the *Housing Journal*, "we were led to believe that the houses erected at Well Hall by the principal architect of the Board of Works, by the Port of London Authority at Plaistow, at Watford by the local authority, and the cottages planned by Mr. Ross Young for the Middle Ward of Lanarkshire, represented the utmost accommodation and the fullest economic value available to wage-earners and their families; they were, in fact, the absolute limit in the provision of houses." We do not know who the "eminent architects" were our contemporary trusted to, but it is common knowledge that by none have the manifest defects in the houses at Well Hall been more clearly pointed out than by Mr. W. E. Riley, the Superintending Architect to the London County Council, whose experience in regard to the housing question is probably unequalled. We ourselves have more than once endorsed his remarks up to the hilt, and we admit at once that the detailed criticism by the *Housing Journal* of the Advisory Committee's model plans is in many instances fully warranted.

Criticism, however, is seldom valuable unless it inspires or guarantees ability to do better, and the *Housing Journal* eulogises under the above title the plans of a "newly evolved health-promoting class of dwelling," letters patent for which have been applied for, and which it thus describes:—

The high economic value which this new class of dwelling can offer at a cost relatively less than that of any existing type of cottage is secured largely by means of its truncated and bifurcated triangular wing portion. This novel form of wing, which is one of the distinctive features of the plan, possesses properties which are both unique and valuable. It enables the office accommodation and other conveniences to be provided exactly where they are required, and the economy which it secures both directly and indirectly is remarkable and unapproachable. The semi-enclosed entrance porch, which is sufficiently roomy to serve as a sleeping porch for the domiciliary treatment of consumptives, is one of its economical contributions, and the direct communication which it provides between the front and back gardens is another.

As compared with the usual type of wing, the gain in space, the saving in material, and the other advantages which it offers are all substantial.

For example, if two ground floor dwellings having 15½-in. cavity walls were each equipped with a wing having an overall area of 100 square feet, the one square, the other triangular, both having 9-in. solid walls and ceilings 10 ft. high, the triangular wing would give about 198 cubic feet more space than the square one, and the value of this space when priced as house-room at the officially based rate of 15d. per cubic foot would amount to £12 7s. 6d.

The saving in walling is also important. The dwelling with the triangular wing actually requires less brickwork with than it would without the wing, whereas the dwelling with the square wing requires much more, the difference between the two amounting to about £7 in favour of the new form of wing for brickwork alone.

In roofing, the square wing would require a separate roof, which would entail much extra cost, but the triangular wing, being covered by a downward continuation of the main roof, entails no such extra outlay, and is secured at the lowest possible cost.

By enabling the water-using appliances of each pair of dwellings to be served by the one stack of pipes, and these of four dwellings to be so conveniently grouped that all four can be served by the one main water supply pipe and the one set of drains and drainage connections, it thus provides for the maximum attainable economy being secured in plumber work.

In this respect alone it offers economic advantages so substantial as to leave the most convenient and economical five-apartment cottages of existing types hopelessly behind.

By providing direct communication between the front and the back garden without any mixing up of tenants in the use of paths, it thus solves without extra outlay the problem for which the relatively costly passage-way shown in the Advisory Committee's model plan No. 6 has been provided, but which, while giving direct access, involves common use and that loss of privacy which such makeshifts entail.

In addition to the foregoing, it offers other important advantages, which will be very fully appreciated by those who attempt to provide the equivalent accommodation in the two-flatted type of dwelling in group 2.

ITS ACCOMMODATION.

The accommodation in each of the flats comprises five apartments, with ample office and other conveniences. Each dwelling has a roomy entrance-lobby, which has in front of it a semi-enclosed entrance porch, which is sufficiently large either to sling a hammock in or to seat a family party. It can be used as a sleeping porch for consumptives.

In order that thoroughfares with their attendant through draughts and the discomforts and even dangers which these entail may be avoided, the dwelling has been so planned that only one outer doorway is required.

Of the five apartments, four are exclusively habitable and one exclusively working, and, as is the case in all good dwellings, the habitable is carefully isolated from the kitchen and office accommodation.

In order that the requirements of the housewife may be most efficiently met, these are fully provided for in a comfortable, well-lighted, and well-ventilated apartment, which is specially arranged and equipped for kitchen and all other working purposes, the fittings being so disposed as to enable her to cut down the work to the irreducible minimum.

Full details of other advantages claimed are given, but without plans no opinion is worth much as to their value. Perhaps when the patent is completed we may have the opportunity of illustrating them.

In the Arrochar Parish Church a memorial tablet has been unveiled in memory of the late Captain M'Cunn, Cameron Highlanders, son of Professor M'Cunn, Tarbet, Loch Lomond. Captain M'Cunn fell at the battle of Loos.

The archæology and history of the parish of Bretforton were the subjects of a paper read by the Rev. J. E. H. Blake to the Birmingham Archæological Society last Wednesday evening. The speaker made special reference to an unusual feature in the church, the legend of St. Margaret being represented in one of the capitols of a column in the nave.

AFFORESTATION: A NATIONAL NECESSITY.

Sir J. Stirling Maxwell, in his lecture at the Royal Institution last Friday on "Scientific Afforestation," drew attention to the national necessity of a policy of afforestation. Argument, he said, was almost superfluous after the Prime Minister's recent statement in the House of Commons, when he told the country plainly that timber at that critical moment absorbed more shipping than any other import; that the situation was, in consequence, very grave; and that in the attempt to reduce imports the problem of timber must be attacked first. The fact was, said the lecturer, that dependence on imported timber had in this war been like a mill-stone round our necks. The German Chancellor, in booming the submarine blockade, invariably coupled timber with foodstuffs, and he thought he had every reason to do so. In increased prices, freights and insurances, and cargoes sunk, we had already wasted in the last three years between thirty and forty millions of money over the business, but the timely expenditure of a fourth of that sum would have established in this country, beginning 70 years ago, all the woods necessary for our security. Our Allies were suffering from our negligence, as well as ourselves, and already the French forests were being sacrificed because we had not taken the precautions long ago taken by every other country. The question, had we made full use of the timber growing in this country? could not be answered till the end of the war, but so little was it considered at the beginning that we had been at war more than a year before any arrangements were made to encourage the use of home-grown timber. It was fair to say that no one foresaw the enormous quantities of timber to be consumed by modern military operations; also that no reliable survey of the timber available in the country existed before the war. No survey had yet been made, nor had any record been kept of the amount felled.

AFTER THE WAR.

A danger period after the war was, he thought, inevitable, when we should be very vulnerable to any Power which could cut off overseas timber, but we must get our house in order as soon as we could. The least we could do, in the interests of national safety, was to increase the area of wood in the country—enough to make us independent of imports for at least three years in an emergency. These islands contained vast areas of rough pasture, little better than waste, and almost uninhabited, and, he asked, could no better use be made of them? Every European country had been faced by the problem, and every country but this had already found the solution in afforestation. There were three matters, he concluded, which must be taken up in advance, and he trusted public opinion would support the Government in getting to work on them at once, even before the end of the war. The first was a survey to ascertain the best forest sites, the second the provision of plants in large quantities, and the third the training of forest officers—the last was the most important of all. We should not succeed in this difficult business unless it was placed in the hands of competent men.

Mr. E. J. Goodacre, assistant to the borough surveyor of Shrewsbury, has received a commission as technical officer to labour units attached to the Liverpool Regiment.

Mr. Arthur S. Butterworth, A.M.Inst.C.E., City Engineer of Port Elizabeth, whose death has taken place in South Africa, was formerly Town Surveyor of Hythe, Kent.

Lance-Corporal A. F. Osborne, whose name appeared in a recent list of posthumous honours as the recipient of the Military Medal, was a general labourer in the Camberwell borough engineer's department.

Damimos Pasha claims to have discovered in Aboukir Bay the site of Canopus, which before the foundation of Alexandria was the commercial capital of the country and the most important religious centre in Lower Egypt. Among the finds is a great public bath of the Ptolemaic period.

THE LONDON COUNTY COUNCIL.

The London County Council, at its meeting yesterday, elected Lord Crewe as Chairman. Mr. John W. Gilbert, the Chairman of the Education Committee, was put forward by the Municipal Reformers for the Vice-Chairmanship, and for the office of Deputy-Chairman the Progressives nominated Mr. T. F. Hobson. Choice of the chairmen of several of the committees is to be left this year to the Progressives. The Building Acts Committee this year will consist of the following:—R. W. Granville-Smith, W. A. Nicholls, Walter Reynolds, H. V. Rowe, Lieut.-Colonel H. H. Tasker, Andrew T. Taylor, H. R. Taylor, H. de R. Walker, Kingsley Wood.

The total of the capital estimates for 1917-18 for the Council's own expenditure is, excluding general contingency provisions, £379,875, or £271,310 less than the corresponding total of the estimates for the current financial year. The amount to be provided in the Money Bill in respect of loans to the various local authorities in London is £200,000 for 1917-18, and a like figure for the following six months; half of each amount will be allocated to loans to the Metropolitan borough councils.

In connection with the proposed reconstruction of the Charing Cross railway bridge, it is suggested to provide an additional staircase from Victoria Embankment to Charing Cross footbridge, giving access to the footbridge from the river side of the Embankment. The County Council is recommended to provide a site.

The Building Acts Committee reported at some length with regard to the Euston Road case, the London County Council *v.* Galsworthy, as follows:—

GENERAL LINE OF BUILDINGS ON THE SOUTHERN SIDE OF EUSTON ROAD BETWEEN SOUTHAMPTON STREET AND FITZROY STREET.

1. On April 18, 1916 (p. 374), we reported that a special case, entitled London County Council *v.* Galsworthy, relating to the general line of buildings on the southern side of the portion of Euston Road between Southampton Street and Fitzroy Street, the settlement of which had stood over from 1912 pending the decision of the House of Lords in the case of Clode *v.* The Council, had been stated by the Tribunal of Appeal, and, in view of the decision of the House of Lords in favour of the Council in Clode's case, we recommended that the decision of the High Court should be obtained upon this special case, and the Council resolved accordingly. The Divisional Court affirmed the decision of the Tribunal of Appeal, and on November 14, 1916 (p. 998), the Council decided to appeal against this decision.

The facts in regard to Galsworthy's case are shortly as follows:—In 1897 the superintending architect of metropolitan buildings denied the general line of buildings in the portion of Euston Road between Southampton Street and Fitzroy Street at a distance approximately 50 ft. from the pavement. An appeal was lodged against this decision, and the Tribunal of Appeal fixed the line at a distance of about 17 ft. from the carriageway, and prolonged the line across Fitzroy Street to Tottenham Court Road. After the decision of the House of Lords in the case of the Council *v.* Fleming (Council Minutes, November 29, 1910, p. 1238), and acting upon counsel's advice, we decided to test the validity of the order made by the Tribunal in 1897. The superintending architect was, therefore, requested to define the general line of buildings with respect to a plot of land within this section. This line was defined between Southampton Street and Fitzroy Street as being approximately 50 ft. back from the pavement. The owners affected appealed to the Tribunal of Appeal, with the result that the Tribunal made an order, dated November 21, 1912, allowing the appeal, with costs, the effect being to reaffirm the line laid down by the Tribunal in 1897. In pursuance of the decision to test the validity of the order of the Tribunal of 1897, the Tribunal was asked to state a special case in order that the Council might be in a position to appeal to the High Court.

The appeal against the decision of the Divisional Court was argued before the Court of Appeal, consisting of the Master of the Rolls and Lord Justices Warrington and Scrutton, on February 27 and 28, 1917, when Mr. Upjohn, K.C., and Mr. Craig Henderson represented the Council, and Mr. Pollock, K.C., and Mr. Herbert Smith represented the respondents. Counsel on behalf of the Council were heard at considerable length in support of the contention that the Tribunal had exceeded their jurisdiction in taking into consideration a portion of the street which had not been dealt with by the certificate of the superintending architect, and which was outside the row or block of buildings in which the building, the subject of the certificate, was situate. The Court held that the Tribunal's decision of 1897 was conclusive against the Council, and that the jurisdiction in regard to the length of street dealt with by them was not in any way restricted to the length of street taken into consideration by the architect in his certificate, and they affirmed the decision of the Divisional Court and that of the Tribunal, with costs against the Council.

A substantial portion of the southern side of Euston Road is affected by this judgment, and the decision, if allowed to stand, will give rights to many owners of buildings on that side of the road which the House of Lords, in Fleming's and Clode's cases, held were not open to owners on the north side of the road. Unless this is to be conceded, the only remedy possible to the Council is to obtain a reversal of the decision; and, having regard to the great importance of the matter, we consider that an appeal should be entered against the decision of the Court of Appeal.

There is provision in estimate No. 14 for any expenditure which may have to be incurred during the current financial year, and any necessary provision will be made in the estimates for 1917-18. We have informed the Finance Committee of our intention to recommend the Council to appeal against the decision. We recommend—

"That an appeal be entered against the decision of the Court of Appeal in the case of the Council *v.* Galsworthy relating to the general line of buildings on the southern side of the portion of Euston Road between Southampton Street and Tottenham Court Road.

STAINED GLASS.

War Memorial Window for Langside Church.—From an anonymous donor Langside Parish Church, Glasgow, has received the gift of a costly five-light stained glass window as a war memorial, designed by Mr. A. Rigby Gray and executed by Messrs. Wm. Meikle and Sons, Glasgow. Its subject is Victory, illustrating not an exaltation of the profession of arms, but rather as an epitome of the spiritual graces and high resolves for which Great Britain is fighting. The central figure is Christ, enthroned, holding a cross, symbolic of the Redemption and power over sin and death. Beside him are St. John, St. Stephen, and a little child representing the three types of martyrdom, and beneath is St. Paul, the Christian soldier, bequeathing to a little child the heritage and fruit of war. In the flanking lights are figures representing Prudence, Justice, Temperance, and Fortitude, and these are trampling on the Dragon of Evil. Overhead a row of figures in the processional indicate the departed spirits who have made the supreme sacrifice. The whole design stands out clearly on a background of silver-grey.

The Scarborough Corporation have decided that before sanctioning any more plans for conversion of large houses into flats a report from the officials concerned shall be considered.

The St. Austell U.D.C. have approved a site for the proposed joint hospital building on the high altitude from Tregonissey Road to the Look Out. The ground consists of about two acres.

The Liverpool Corporation reports 21,000 burst water pipes, and serves notices to repair "when the weather permits." Fair weather, however, does not produce plumbers, while damage and delay add to the serious cost. The Birkenhead Corporation notifies: "Repairs must be effected in three days, or the corporation will perform the work and charge the owners." Liverpool owners, perplexed for lack of plumbers, would hail the Birkenhead notice with joy.

A REASONABLE COMPLAINT.

Mr. E. Peter Jones, of the Mersey Ironworks, Ellesmere Port, in a letter to the *Nation*, says:—

"Before the war my business was in a most efficient and progressive condition, employing over 1,000 workpeople, and exporting goods to the value of one million per annum. This export business was seriously crippled as soon as the war broke out, and owing to that, and latterly to the suppression of the industry by the Ministry of Munitions on account of the shortage of raw materials, the plant has not worked on the average at more than one-third of its capacity since the war began.

"The works, which is one of the most modern and economical in the country, consisting of over eight acres of buildings, equipped throughout with electric cranes and power, and served by private sidings and canal, was offered to the Government in November, 1914, and to the Ministry of Munitions in June, 1915, for the purpose of shell manufacture, for which it is almost ideal, but each time the proprietors were told that it was not required.

"No effort of any kind was made to utilise the works in the national interest, or to put any other business in the way of the firm, in place of that which it was found necessary in the national interest to destroy, until October, 1916, when, after further representations, some little work was found for it, but at a price which cannot compensate for the suppression of its pre-war business.

"Meanwhile, expensive sites have been purchased and costly plants erected all over the country (some in the same township) without any previous inquiry into the resources of the neighbourhood. Apparently certain individuals got jobs to erect new plants, and naturally did not want to know of existing plants. Thus we arrive at the policy of erecting State factories, which will be idle after the war, or sold for much less than their cost, and the ruin of private establishments by closing down their business and drafting the men away under the Volunteer Service Acts to State factories.

"One is willing to suffer a great deal for this war, but that is the kind of justice which makes one feel that when the war is over it would be wiser to transfer one's energies and experience to where they are likely to meet with fairer recognition."

The Tullamore Urban Council have decided to extend the manual instruction room of the Technical Institute by about 37 ft. at an estimated cost of between £220 and £240.

At the annual meeting of the Birmingham Society of Artists, held on Saturday evening, the following were elected members:—Mr. John R. Harvey and Mr. V. De Ville; and as associates, Mr. Bernard Munns, Mr. Ernest Treglown, Mrs. Gaskin, and Mr. H A. Payne.

According to the lists which come into force on April 6, the gross valuation of London is £55,533,572, an increase of £160,092 since April last. The rateable value, £45,363,520, shows an increase of £150,337, and compares with an increase of £231,083 shown by the first supplemental valuation lists of the quinquennium 1911 to 1915.

The Board of Trade has ordered, under the Defence of the Realm Regulations, that the provisions of Article 2 of the Paper Restriction Order, 1917, so far as they restrict the exhibition of posters making announcements with respect to the contents of, or advertising in any manner, any newspaper or periodical, shall extend to posters or advertisements of a similar character, of whatever material they are made. It was certainly time, in view of certain evasions of an order all respectable papers at once loyally observed.

Mr. and Mrs. Ward, of Lansdown, Stourbridge, have received official intimation of the death in action of their only son, Second Lieut. William Ward. He entered the Army at the beginning of the war, joining the Public Schools Battalion at Epsom, and after a few months was granted a commission in the Worcesters. He was articled to Mr. W. Fiddian, engineer and surveyor, and afterwards, until he left civil life, was engaged in the Government valuation offices in London. He was educated at Wolverley Grammar School, and had just passed his 27th birthday.

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NEW OFFICES OF THE DEPARTMENT OF EDUCATION FOR NEW SOUTH WALES AT SYDNEY.—Mr. GEORGE McRAE, Government Architect.

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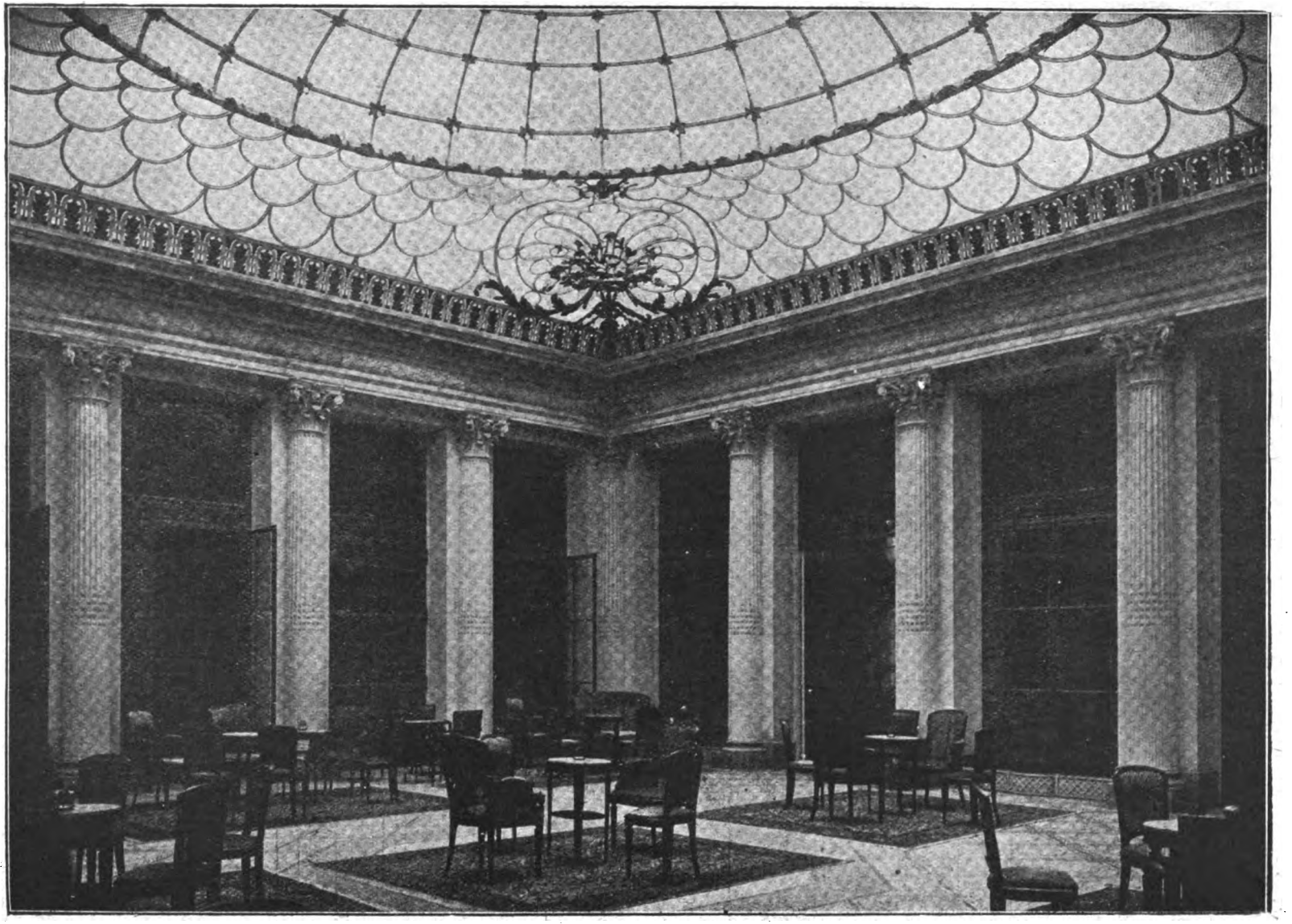

THE GRAND HALL, HOTEL MEURICE, PARIS.
M. HÉNRI PAUL NÉNOT, R.I.B.A. Royal Gold Medallist 1917, Architect.

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Thomas Lewis, Limited, Photo.]

STOCKPORT GRAMMAR SCHOOL: THE GREAT HALL FROM THE QUADRANGLE AND ENTRANCE CORRIDOR.

Messrs. REGINALD H. SPALDING and ERNEST G. THEAKSTON, FF.R.I.B.A., Architects.

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THE BANQUE DREYFUS, RUE DE LA BANQUE, PARIS.
M. HÉNRI PAUL NÉNOT, R.I.B.A. Royal Gold Medallist 1917, Architect.

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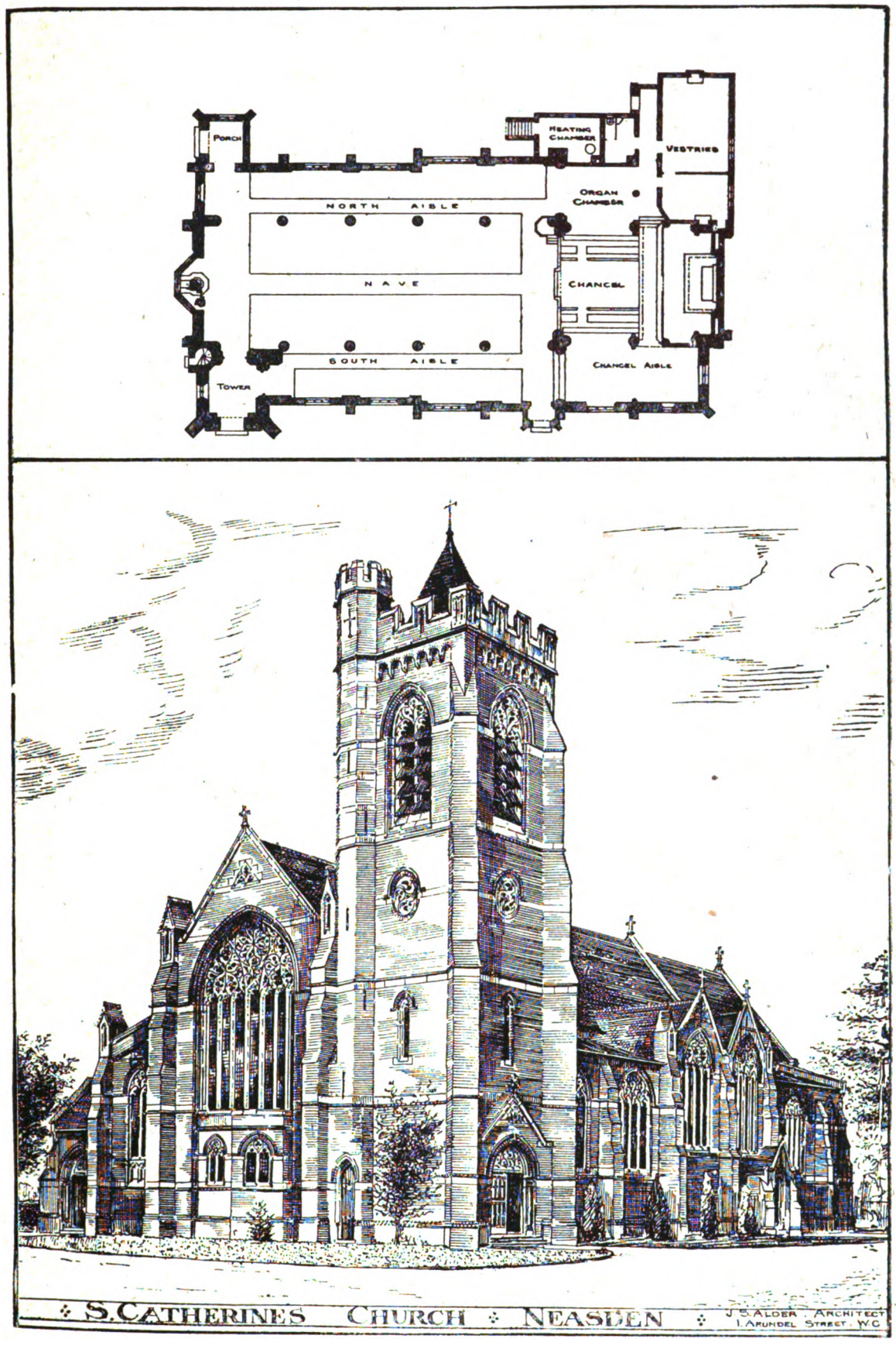

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Our Illustrations.

STOCKPORT GRAMMAR SCHOOL.

The entrance front and interior view of the assembly hall, together with the plans and description of this new building, lately finished, were published in our issue for February 28 last. To-day we give two more photographs of the school premises—viz., the Quadrangle view of the Great Hall and of the Cloisters or Entrance Open-air Corridor. Messrs. Reginald H. Spalding and Ernest G. Theakston, FF.R.I.B.A., of Lincoln's Inn, are the architects. Messrs. D. Eadie and Co., of Stockport, were the builders. Some good scale details of this work will appear in our pages shortly.

THE BANQUE DREYFUS AND THE GRAND HALL OF THE HOTEL MEURICE, PARIS.

In our issue of February 28 we gave several particulars concerning the life and work of the Royal Gold Medallist for 1917, M. Hénri Paul Nénot, Hon. Foreign corresponding member of the R.I.B.A. and member of the Institute of France. On Wednesday, March 7, four sheets of illustrations were devoted to his greatest work, the National University of the New Sorbonne, built in the Rue des Ecoles, Paris. An epitome of the history of this vast educational establishment appeared in the same issue. To-day we present some photographs, kindly sent us for the purpose by M. Nénot, the subjects of which are "The Banque Dreyfus, Rue de les Banques," and an "Interior of the Grand Hall of the Hotel Meurice," also at Paris. We shall give some other illustrations of the Royal Gold Medallist's admirable and typical buildings at an early date.

NEW OFFICES OF THE DEPARTMENT OF EDUCATION FOR NEW SOUTH WALES AT SYDNEY.

These new offices for the Government Department of Education, Sydney, New South Wales, occupy about half the block bounded by Bridge, Loftus, Young, and Bent Streets, and after removal of the old offices of the Department of Public Instruction, adjoining at the rear, the entire scheme will be completed by the erection of a corresponding portion for housing the officials of the Department of Agriculture. The street façades are of freestone, treated boldly, yet with simplicity, in the Renaissance style, and, though harmonising with the adjacent Government buildings, present a pleasing contrast in simplicity of design. The interior of the premises is plainly finished, but in the Bridge and Loftus Streets entrances and staircases the judicious introduction of coloured native marbles in wall panelling, columns, pilasters, etc., has produced an excellent effect. Special attention has been given to light and ventilation, heating, and vacuum-cleaning, in which regard the building ranks high in comparison with other modern office buildings in the city. The extensive flat roof provides ample yard and promenade space, and a part is being adapted for miniature rifle-range purposes, with an effective range of about 80 ft., and complete immunity from danger. The building was designed by Mr. George McRae, Government architect.

CHURCH OF ST. CATHERINE, NEASDEN, MIDDLESEX.

We gave a double-page interior view of this new church, not yet finished, in our issue of January 17, when a description appeared. To-day an exterior sketch and a plan of the building are published. Mr. John S. Alder, F.R.I.B.A., of Effingham House, Arundel Street, Strand, is the architect.

The council of Trinity College, Glenalmond, are appealing for help in raising a memorial fund, to be devoted partly to the erection of a suitable memorial in the college chapel and partly to giving assistance where required, for the education of the sons of Old Glenalmonds who have given their lives in the war. Copies of the appeal may be obtained from the warden.

Correspondence.

REGISTRATION OF BUSINESS NAMES.

To the Editor of the BUILDING NEWS.

Sir,—May I point out that, strictly speaking, Wednesday, the 21st inst., is the last day for existing firms to register? Thursday, the 22nd, is generally supposed to be the last day, but the Act says "Before the expiration of three months from the passing of the Act." The Act was passed on December 22. The third month expires on March 21, and the fourth month commences on March 22. Possibly some indulgence may be shown to late-comers who have not understood this, but the counsel of perfection is to be on the safe side.

An amazing amount of ignorance on this new Act exists, even in high quarters. A Member of Parliament actually asked the President of the Board of Trade when the "regulations" would be ready, as he wanted to know whether an individual carrying on a profession or business with the words "and Company" after his name was required to register! Any intelligent student of the Act itself could have told him that the answer is in the affirmative without waiting for the "regulations" or wasting the time of the House of Commons and a Cabinet Minister.—Yours, etc.,

GEO. W. DAINES.

The Information Bureau, Ltd.,
140, Strand, W.C.

OBITUARY.

The death is announced, in his seventy-first year, at Chelmsford, of Mr. William Henman, F.R.I.B.A., who, prior to his retirement, was well known as an architect, and principally as the designer of the Birmingham General Hospital. Born in London in 1846, the son of the late Mr. Charles Henman, a Fellow of the Royal Institute of British Architects, the deceased gentleman passed some of his early professional years in the office of Mr. T. Hayter Lewis, F.S.A., Professor of Architecture at University College, London. Mr. Henman started practice at Stockton-on-Tees and Middlesbrough with Mr. J. W. Alexander. They competed for the erection of many public buildings, among their successful designs being those for the West Bromwich Town Hall, the Handsworth Public Buildings and Free Library, and a similar building at Aston. Dissolving partnership with Mr. Alexander, Mr. Henman removed to Birmingham in 1879, and, entering the competitive arena again, had his designs accepted for the infirmary of the West Bromwich Union. The deceased gentleman was also a good domestic architect, and the erection of his house in Westfield Road, Edgbaston, led to many commissions for this class of work in that district. He also did a good deal in the way of church restoration in various parts of the country, and also designed a number of school buildings and the Newcastle Free Library. His principal work, however, as stated above, was the Birmingham General Hospital, the design for which was awarded the premier prize by Mr. Alfred Waterhouse in a competition which attracted much notice professionally. Mr. Henman was much esteemed among his brother architects, and filled the office of president of the Birmingham Architectural Association from 1894 to 1897. He retired about 1912, and the evening of his days was spent in the South of England.

We regret to announce the death, which took place on Monday morning week, at his residence at Thames Ditton, of Mr. Gibson Thompson, founder and editor of *The Surveyor*. Mr. Thompson, who was fifty-nine years of age, in his youth gained an insight into municipal work at Camberwell, where his father was proprietor and head master of St. Mary's College, Hanover Park. He was engaged for some time in the office of the vestry clerk of Camberwell, the late Mr. G. W. Marsden; but, resigning his position, proceeded to Portugal and engaged in literary work. Returning to London, he was able to extend his connection with literature, and was the author of many fugitive pieces in various periodicals. He subsequently commenced the publication of *The Surveyor*, and speedily made for it the established position it has long occupied. The funeral took place last Thursday afternoon at Thames Ditton, the committal being preceded by a service in St. Nicholas's Church, at which the Rev. B. H. Bosanquet, vicar, officiated. The family were represented by Mr. E. D. Ellis (brother-in-law) and Master Langhorne Thompson (son of the deceased), and others present included Mr. H. Percy Boulnois, Mr. E. C. Pinks, Mr. Prescott Row, Mr. Charles Reid, Mr. Charles Mason, and Mr. Horace Mason, the three last-named representing the editorial and business departments of *The Surveyor*.

The death occurred last Thursday, at his residence, 65, Sandon Road, Edgbaston, of Mr. William Henry Ward, an architect, who for more than 50 years practised in Paradise Street, Birmingham. Born at Hamilton, Scotland, in 1844, and educated at Glasgow and Hereford, Mr. Ward was articled to the late Mr. James Cranston, with whom he saw a large amount of important work, notably in church architecture, and gained a thorough knowledge of the routine of his profession. He went to Birmingham in 1865, and built up a large practice, which he carried on until the early part of 1914, when he retired in favour of his son, who for a long period had been his partner. Soon afterwards war broke out, and Mr. Ward, junior, who was an officer in the Territorial Force, was called up for service. His father then returned to the office in Paradise Street, and carried on the business until the recent illness which resulted in his death. Mr. Ward specialised in public work, and designed the Dudley Road Infirmary, the City Sanatorium, in Yardley Road, as well as the one at Salterley Grange, Cheltenham, and also the City Hospital at Little Bromwich. Among other important buildings which were erected to his designs were the Great Western Arcade, the Grand Theatre, the Union Offices in Edmund Street, Lincoln's Inn Buildings, and several of the principal hotels and restaurants. He was also the architect of infirmaries, workhouses, and sanatoria at Brentford, Bradford, Doncaster, Sheffield, Wolverhampton, Alcester, Solihull, Nottingham, Chesterfield, and many other places. He restored Maxstoke Castle for the late Sir Charles Featherstone Dilke, parts of Warwick Castle for the late Earl of Warwick, and a number of churches were built or restored in accordance with the plans he prepared, including part of St. Mary's, Handsworth. Mr. Ward, who was in his seventy-third year, leaves a widow, a son, and two daughters.

Competitive designs are being invited by the Oldham Corporation Health Committee for the erection of a nurses' home at Westhulme.

A Government Bill has been introduced in the Ontario Legislature providing for the construction of a provincial highway from Detroit River across Ontario to the Quebec boundary, a distance of five hundred miles.

In a report on town-planning the General Purposes Committee of the Dudley Corporation states that it frequently takes from three to four years to secure the final adoption and confirmation of a town-planning scheme.

Lieutenant G. W. Callender, Worcestershire Regiment, who has been killed, aged twenty-seven, was a son of Mr. William Callender, general manager of the Bank of New Zealand. He had just qualified as an architect when war broke out, and he joined the Artist Rifles. He was commissioned to the Worcestershire Regiment in 1915, and was promoted lieutenant six months afterwards. He left for the front on September 6, 1916.

The members of the Dundee Poorhouse Committee have adopted a new line of action in connection with the proposed erection of an isolation hospital at Ashcliffe. Two schemes have been before the committee, one estimated to cost £1,000, the other £3,000. At the last meeting both were abandoned in favour of a proposal that the whole question be remitted to a new committee to endeavour to evolve a new scheme.

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ECONOMIC RECUPERATION AFTER WAR.*

By Prof. W. R. SCOTT, D.Phil., Litt.D., LL.D., F.B.A.

When one endeavours to pierce the veil that hides from us at present those future years which will be brightened by the return of peace, it seems as if popular opinion hovers between two opposite poles of thought. The one type thinks of peace as meaning a resumption of social and economic life just as it was when its normal development was interrupted by the outbreak of war. The other type is quite the opposite—it seems to regard the early days of peace as an economic *tabula rasa* upon which a new economic history may be written. Yes, a *tabula rasa* perhaps—but only in the sense that economic movements, both of the past and of the present, have left invisible traces upon it in a species of secret writing which will gradually come to light when the war is over. As differentiated from these one-sided views, there must be divined something of the future based as much as possible upon economic knowledge and the resources of past experience in so far as these are applicable. Indeed, such an inquiry, apart from its practical value, is a test of the efficiency of modern political economy, which, to the extent to which it is a science, should be able to predict. Yet prediction, as regards the present war, has been largely falsified by events to a degree which has been remarkable. Thus it is certainly safer, if less enterprising, for the economist to wait upon events, contenting himself with classifying, investigating, and pronouncing upon these after they have happened. This is useful work, but the time for much of it is not yet; rather may we not try to see, however imperfectly, something of the reaction of the present war upon the future of industry, thereby attempting to forecast the material destiny of Europe during a part of the next generation?

Moralists, poets, philosophers, economists, and statesmen have written much of the evils of war. To each nation, whose temperament is essentially pacific, there is given a clear vision of the losses involved in a state of hostilities. On its material side war involves immense destruction and waste; and it is this which has to be repaired in the subsequent years of peace—if that be possible. Accordingly, the first step will be to estimate the volume of the loss of wealth occasioned by warfare. There is, first, the loss of human productive power in so far as productive workers are killed or suffer in industrial efficiency by reason of wounds or disease due to war. Here is a war loss which is obvious, and which is irreplaceable till a new generation fills the vacant places, or alternatively, till a new supply of labour can be drawn from elsewhere. Secondly, during the progress of hostilities highly skilled labour is diverted from productive to destructive employments. In the third place, the consequences of this are visible in the devastation to which tracts of country have been subjected which have been fought over by contending armies. Again, naval operations have involved losses of shipping. In the fifth place, the general supply services of armies in the field inevitably occasion a certain waste of stores. Then, in the sixth place, the high cost of modern war is likely to impose a certain strain upon the credit and finance of the combatant countries. In most cases immense additions to the funded debt are already necessary, and these will grow with the duration of the war. In addition, there are unfunded borrowings, whether in the form of bank credits to a government or in largely increased issues of paper money. Sooner or later these debts must be faced, and the interest on a funded debt will impose a heavy burden on future industry for many years to come, while unfunded debts or excessive issues of paper money will probably be dealt with by the flotation of a loan when the time is judged opportune. Here, again, there will be a further charge for interest. It may be that where the credit and financial systems have become highly artificial, the position cannot be adjusted without a commercial crisis; and, if so, the losses through a temporary collapse of credit, caused indirectly by the war, must be added to the more immediate war losses. Even yet the melancholy catalogue is not complete. There remain minor factors to be reckoned. There is a certain dislocation of production which arises upon mobilisation, and again upon demobilisation. If the industries of a country were organised efficiently before the war, the diversion of demand and contraction of production usually, if not, indeed, inevitably, involve producing at a less advantage than before. Again, the closing of trade routes forces recourse to substitutes for some commodities previously used, and the substitutes are frequently either inferior, or else more costly. War, in fact, removes many of the advantages which previously accrued from territorial division of labour.

Changes of territory, too, as a result of peace terms, have to be reckoned. Here, in the aggregate, the loss to production in general is to be measured by the extent to which the new owners of such conquered or ceded districts are less efficient producers than its former owners; while, conversely, if the ultimate settlement follows the broad lines of racial divisions, a gain rather than a loss may be anticipated in the greater contentment and more congenial political affinities of the population affected by the change. Again, there is the question of indemnities, which, in principle, is closely connected with that of loans to be raised for purposes of war, adding to the debt of the country which pays the indemnity and lessening *pro tanto* that of the country which receives it. In the aggregate it would seem that this process involved a mere transfer of a claim to wealth from one country to another, but it may be questioned whether, under the conditions which are likely to govern the final settlement, and where the indemnity is paid by one great power to another great power, the sacrifice of the former may not be larger than the benefit accruing to the latter. Also, there is the element, at present largely indeterminate, of the position of tariffs after the war. Clearly a state of international relations in which, after a political peace, a war of tariffs was waged, would be yet another element to be added to the long list of war losses, in so far as trade was diverted into artificial channels beyond such a degree as its course was facilitated by lesser Customs duties amongst friendly nations. So much depends upon the course of the various campaigns, and the state of feeling between the present time and the declaration of peace that, while the possibilities offer a fascinating field for conjecture, the elements of the problem are too uncertain and too fluctuating to afford any firm basis for calculation. At the moment of writing it would appear that this is a phenomenon of which account must be taken.

The foregoing factors, while not exhaustive, appear to be the chief which have to be considered. It is needless to say that the list is already long, and it is a distressing one. But the mere enumeration of these conditions only opens up the really difficult problem of the degree of importance which is to be assigned to each. And that difficulty becomes intensified by the fact that all these causes will continue to operate in varying degrees during the unknown period which must elapse until peace is declared and industry can return to its normal course. Therefore, all that is possible is to attempt to signalise those causes which are likely to be most powerful in determining the post-bellum conditions. Two of these stand out pre-eminently. These are the loss of labour-power and the accumulation of debt, whether funded or unfunded. It would seem that for many years to come the Great Powers of Europe will be weary Titans toiling painfully under the crushing load of their public obligations. And the diminution in the supply of labour seems to make the process of recovery slower than it would have been had the slaughter been less. Moreover, the efficiency of credit has made it possible to mortgage future production to an extent previously unknown. No doubt, ultimately, the modern system of credit will enable the burden to be diffused over the production of a long period, but it can scarcely be anticipated that the transition from credit on a war basis to credit on a peace basis can be effected without a serious crisis in some of the belligerent countries, perhaps not immediately after the war, but not very long after peace has been made. Such a crisis, should it come, would delay recovery in the countries where it occurred, and it would react upon the renaissance of industry in other nations whose credit had stood the strain with less disturbance.

In confronting a situation so unparalleled both imagination and courage are required—imagination to divine the economic conditions of the new Europe which will arise out of the suffering of the old; and courage, too, in order to recover as quickly as may be and upon a secure basis from the enormous losses which are accumulating daily. It appears to me that, when one faces the future in this spirit, the degree of the resilience in industry may easily be underestimated. To a very considerable extent the disorders which war is inflicting upon industry are generating antidotes. The swollen war costs are forcing economy upon the belligerent peoples. Observers of pre-war social conditions cannot fail to have noted the rapidly rising standard of living over a very great part of Europe. In the closing years of last century, and during the early years of the present one, the peoples were garnering the fruits of more than fifty years of remarkable economic progress. Thus, habits of comfortable, and even luxurious, living had been formed. The present generation had become accustomed to that form of free spending which Aristotle described as the characteristic of those who, having inherited wealth, had never known privation (ἐλευθεριώτεροι δὲ εἶναι δοκοῦσιν οἱ μὴ κτησάμενοι ἀλλὰ παραλαβόντες τὴν οὐσίαν· ἄπειρόι τε χὰρ τῆς ἐνδείας).*

War is enforcing a return to a more Spartan régime. Gradually habits of economy are perforce replacing those of profusion. But as these habits become established, their influence will tend to persist when the war is over. Hence resources will be derived from this source, partly to pay interest on war debts, partly further to supply the new capital which will be required in large amounts to replenish working capitals and to replace buildings, plants, and means of transport which have been destroyed during hostilities. Thus there are indications that the war itself is calling into existence a fund from which some of its own waste will be repaired. War and luxury are alike unproductive expenditures; but while the latter has been continuous, the former outlay is compressed into a comparatively brief period, thereby anticipating at one bound the disbursements upon luxuries during many future years.

It is in this way that the recapitalisation of industry will be provided, and that, it may be hoped, without undue delay. It is to be remembered that the productive capacity of the extractive industries remains unimpaired, except in the event of war lasting so long that permanent improvements in the land may become seriously depreciated. Though factories may be stopped during the war, to a large extent their productive capacity remains. In a country whose resources are ill-developed these are the only productive losses to be faced, and the recovery of them should not be difficult, particularly if it can be aided by moderate loans of working capital from outside. A highly developed region in which there has been great destruction of buildings and machinery requires larger outlay; but it will usually either have greater means for producing the new resources itself, or it can offer security to borrow what it needs abroad. Thus it would appear that great as the call upon capital will be, means may be foreseen by which it can be provided.

So far as the argument has been developed, grounds have been adduced to indicate that industry can be restarted after the war upon an adequate scale. Still, the approximate magnitude of that scale is of vital import-

*A paper read Feb. 20, 1917, before the Institution of Engineers and Shipbuilders in Scotland.

* *Eth. Nic.* iv. 20.

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ance. Here the labour supply—both as to quantity and quality—must be considered. No one can yet estimate with precision the probable total of the killed. In addition, there will be all those wholly or partially disabled by wounds and disease. Therefore an initial survey of the position as regards labour shows a large deficit in the supply as it existed before the war. And so, upon a hasty inspection of the situation, it might be concluded that not only was capital likely to be deficient after the war, but, still more, industry would be cramped for a number of years by a very material reduction of labour. But this estimate only considers the quantity of the labour in employment immediately before the war. There is, first, the extension of that quantity. The war has revealed in most of the combatant countries unanticipated reserves of labour. Men past the prime of life, and also women, have discharged many functions in industry which were new to them. Naturally, this new supply of labour is to some extent an emergency one, but its existence shows that after the peace a large augmentation of the quantity of labour is possible. There is still the question of efficiency. The progress of hostilities has proved that several countries have been working on too narrow a margin of skilled labour. In order to carry on the industry of the country it has been necessary to train large numbers of new workers; and after the war the skill of these will remain as a potential national asset. It is true that in Great Britain agreements have been made with the trades unions that the employment of workers, unskilled before the war, in specified skilled trades during the war, is to be purely temporary. While this arrangement will be loyally observed, scope will, no doubt, be found for these lately trained workers in new industries which will, no doubt, be rendered possible by the progress of inventions, while it may be that a much better organisation of industry may be arranged, so that industries may be reconstituted in such a manner that neither employers nor employed would desire to return to the conditions. A great and just war such as this has been the means of a quickening of the national spirit, partly through the awakening it has experienced, partly under the spur of necessity. Invention will be greatly extended, and new discoveries will play their part in the restoration of prosperity at a later date. Then the consequences of the Napoleonic wars may be repeated; and, as they were followed by the great Victorian era of invention and industrial progress, so the war of the twentieth century will be succeeded by a similar period. And that epoch will follow the war more closely than the developments of the nineteenth century followed the previous war; for war has now become so mechanical that it has evoked the best energies of thousands of inventors. Some of these discoveries will be capable of adoption to the uses of peace; while in other instances the augmented capacity of the inventors will be available, and will be more efficient than if it had not been evoked by the present tragic circumstances. Besides, this principle of substitution will be at work, and further introduction of labour-saving machinery will take place in such cases as its efficiency can be demonstrated. Indeed, even during the war, there have been instances in which already such machines have been devised and used upon a comparatively extended scale. In fact, just as the watchword of the first years of peace in the provision of capital will be the continuance of economy, so in the case of labour economy in its use will also be necessary. Moreover, it is to be hoped that the nations of Western Europe will respond to Nature's demand for population; and that in this case, as in that of previous wars, there will be an improvement in the birth-rate, in order to replenish the losses in productive power during the period of hostilities. Thus the terrible waste of humanity may be repaired—in the first instance by continuing to use, so far as necessary, the reserve of labour called up by the war, and later by an influx of workers due to a larger proportion of births and a reduction of infantile mortality.

Some considerable friction in the readjustment of the post-bellum supply of labour to the demand for it is inevitable. Exclusively war industries, which, during hostilities, have been incessant in their call for labour, will begin almost at once to reduce their staffs. Conversely other trades which were suspended, or whose operations were seriously contracted, will be anxious to make a fresh start after peace. Moreover, demobilisation will return men from the colours to the avocations of peace time. In this process it would appear that confusion, with resulting temporary unemployment, would be inevitable, unless a species of clearing house for demobilised labour had been devised. No doubt this would follow if demobilisation were as sudden as many of the mobilisations have been. But various conclusions indicate that demobilisation will take place by stages, and, therefore, industry will have a better chance of reabsorbing the labour which was displaced in order to undertake military service. Any radical change in tariffs would increase the difficulties in the reabsorption of labour. It is possible that after the war the scale of operations of many industries will be considerably changed. An important alteration in tariffs would cause a great reduction in some trades and an increase in others. Thus important bodies of skilled workers upon their return might conceivably find the demand for their labour very largely reduced, and it would be small immediate compensation to them to learn that there was a wide field for workers in another trade which had increased. Further, if, as seems to be necessary and unavoidable, the first years of peace will witness a continuance of war economy, though to a modified extent, then the luxury trades must suffer, except to such extent as some of them can add to their otherwise reduced output by producing for export in order to replace some part of the lost home consumption. But the consuming power of that diminishing part of the world, which is at present neutral, would not suffice to absorb that portion of the production of those trades which is likely to be displaced from the home market. Accordingly it is to be anticipated that in this, as well as in other directions, important variations in demand are to be anticipated. Still too much stress need not be laid upon the inevitable dislocation of industry upon the return of peace. One of the discoveries of the war has been (as I have endeavoured to point out in my presidential address to the Economic Section of the British Association in 1915) the great extent to which specialised labour and capital have been able to adapt themselves, soon after the outbreak of hostilities, to meet new and unexpected demands. In this respect, at least, it may be anticipated that the converse movement, when the war is over, will be less rather than more difficult.

What, then, is to be the general conclusion? Speaking from the data at present available, and with due reserve for the absence of information concerning some of the belligerent countries, and in view of all the uncertainties as to how long the waste of war is to continue, I may perhaps describe my general results as those of a conditional optimist as regards the state of Europe during the first decade after peace has been made. Dangerous as similes are in economic reasoning, one may afford some light upon the situation which is likely to result. As regards those nations in Europe which are at present combatants, imagine an owner of land who is at the same time engaged in some productive occupation, and who has become involved in a serious lawsuit which menaces both his vital interests and his property. The time spent on preparing his case, as well as the anxiety, will lessen his income from his occupation, and he finds himself compelled to disburse great sums unexpectedly in legal costs. He is forced to mortgage his property, and when the contest in the law courts is ended, he must pay the interest on the debt, and as soon as possible begin to repay the principal. This will mean that many improvements on his property which he had planned may require to be postponed, and certainly he will need to curtail his luxuries, it may be even many of his comforts. Further, the magnitude of his expenses will be the measure of the period of his sacrifices. He is, in fact, exchanging as against one huge, immediate, unproductive expenditure, the future unproductive expenditure of many years to come. The duration of his privations may be contracted by extra efforts in augmenting his production, either by increase of efficiency or by additional work. Here a nation has an advantage over the imaginary individual of our illustration. In a sense, it is always young. A time of privation forces new activities, and it enables progress to be hastened. In a measure the population of a country, just recovering from the losses of war, resembles the indentured bondsman of the early English plantations in North America, where the man who was in earnest worked at high pressure to liquidate the debt and to attain his economic freedom as soon as possible.

To continue the parable, just as the losses of war will fall with varying incidence on different countries, so a detailed examination of the position of various litigants in the circumstances indicated will reveal interesting individual differences. One may have been forced to pledge his property very deeply, and at burdensome rates of interest. Should he lose his case and be mulcted in damages, then his affairs are likely to suffer serious embarrassment for a long time afterwards. The whole business of another may be seriously disarranged; yet, even though for a few years his estate may yield him little if any return, a successful issue will enable him in time to re-establish his fortunes. In the case of a third, it may happen that relief will come through the cessation of a state of relations with his neighbour which gravely impaired the development of his property and the pursuit of his legitimate activities.

Such seems to be the future position, symbolically represented. Can we see it more perfectly as it will be in its essentials? That at present is scarcely possible. Some of the important factors are unknown, or only partially known; it may even be that others have not yet revealed themselves. But one thing may be expected—namely, that the general burden will be very considerable. Combatant nations cannot anticipate the unproductive expenditure of future years and transform it into present unproductive expenditure in war without experiencing the pinch of a certain amount of want for a considerable period in the future. In the words of the proverb—"One cannot eat one's cake and have it too." We in 1916-17 are, so to speak, eating the cakes of 1917 to—let us say—1919, and even later. In the intense preoccupation upon national existence (as each nation conceives it), and in the grief of so many families for the fallen, the burden is not yet fully realised. Consciousness of it will come when, after the peace, life endeavours to return again to its former courses. Then the burden of present unproductive consumption in war will be felt, and in preparation for that time it is the duty of Governments to endeavour in advance to adjust that burden to the capacity of those who have to bear it. Equitable adjustment of taxation and improved organisation of commerce and industry will do much to make the people more capable of sustaining the load they will have to carry. In particular, should we not learn something from what may be described as one of the paradoxes of the war—namely, that while there never has been a war in which material appliances have been so important, at the same time it is no less true that, conversely, there never was one in which immaterial wealth, and even moral ideals, were so supreme? And towards repairing the waste of war, an important function will belong to the immaterial. Activity of mind and flexibility of intelligence to seize the opportunities of the new peace (which may differ from that peace which was shattered by the war); inventiveness to advance man's conquest of Nature (which in reality is man's co-operation with Nature), economy in the employment of the resources (both human and material)—all these will shorten that period during which the sacrifices, which the present demands of the future must be endured.

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PROFESSIONAL AND TRADE SOCIETIES.

THE EVOLUTION OF ROMAN POTTERY.—At the monthly meeting of the Society of Antiquaries of Scotland last week, Mr. James Curle, F.S.A.Scot., read a communication on "Terra Sigillata or Samian Ware: Its Production and Evolution." He stated that the whole production of this ware, so widespread throughout all the Roman provinces, might be traced back to the potteries of Arezzo, in Central Italy, and of Putcoli, on the Bay of Naples. The infiltration of Arretine ware to the provinces was illustrated by the finds from Haltern and Xanten, dating from the Augustan period. The decorated vessels were of the Krater type, and were really cheap substitutes for the beautiful silver cups prized in the Roman world, of which admirable examples had been brought to light in the treasures of Hildesheim or Boscoreale. The sites successively occupied, as the Roman conquest flowed and ebbed across the Rhine, provided material from which it was possible to follow the evolution of provincial Roman pottery. The early carinated bowls, which succeeded the Krater type about the reign of Tiberius, were well illustrated in the collections at Mainz, Wiesbaden, and Xanten. Rottweil and Windisch gave good examples of the early Flavian period, while for the reign of Vespasian we had dated examples from Pompeii. In this country Newstead illustrated the decoration of Domitian's reign, and the gradual abandonment of the earlier wreaths and garlands in favour of figure-subjects and scenes from the circus, probably reflecting the movement of the frontier northwards, and the sporting proclivities of the military posts. By the end of the reign of Trajan the South Gaulish potteries appeared to have yielded their place to Lezoux, which all through the Antonine period carried on a widespread trade, especially in Western Gaul and in Britain. Towards the north its output was probably checked by the competition of the East Gaulish potteries, which sprang up along the river valleys that formed the highway to the Rhine. In the second century the centre of gravity was shifted towards the north, the legionary fortresses were becoming large centres of population; towns such as Trier and Cologne were increasing in importance, and here, as in modern times, trade followed the standards, and the potters moved north, taking with them the designs which had been invented in southern workshops. The earliest of the East Gaulish potters probably began operations in the reign of Domitian. Rheinzabern and Trier were the most flourishing seats of the industry under the Antonines, and they furnished evidence of the decline which led to its utter extinction.

ROMANCE OF OLD FURNITURE.—A lecture on the romance of old furniture was given by Mr. John Warrack last week in the New Gallery, Shandwick Place, Edinburgh, in connection with the exhibition being held there in aid of Edenhall Hostel for Limbless Soldiers and Sailors. Sir Robert Lorimer, A.R.S.A., presided. The most important part of history, the lecturer stated, was the story of men's thoughts, ideals, and tastes reflected not only in public or political actions, but in a subtler way in all the things made or chosen for everyday use. The fifteenth century, mainly represented in the exhibition, was the period in which native ideals were expressed by native craftsmen in native materials. In the world before the sixteenth century there were a simplicity and humour and a love of outdoor sports and nature which gave a distinctive note to their arts. There was little movable furniture in early times, and what there was seemed to have been developed from the oak chest. The main decorations of the rooms consisted of sets of tapestry which covered the cold stone walls. Several of the tapestries in the exhibition were explained by the lecturer, who then went on to discuss antique furniture. The expression "taking the chair" was attributed to the fact that a table formerly consisted of a long board, round which the guests sat on benches; at the end of the table there was one chair on which the host sat, so that the chair carried the idea of state and authority. The first chairs made without arms, it was stated, were the result of extravagance in ladies' costume, crinolines having grown to such a size that chairs had to be produced without arms.

ROYAL SCOTTISH ACADEMY.—The annual assembly of the Royal Scottish Academy was held last Wednesday afternoon.—Sir James Guthrie, President, who occupied the chair, made a reference to the great loss the academy had just sustained in the death of their treasurer, Mr. Hippolyte J. Blanc. He commented on Mr. Blanc's many activities and sympathies, as evidenced in the various societies with which he was connected, and especially on his loyalty to the academy, both as a member and a trusted official. As a token of the respect in which Mr. Blanc was held by the members, the election of a treasurer, which is always on the agenda of the annual meeting, was postponed for a week. The council, in their annual report, state that the continuation of war conditions into a third year caused considerable anxiety in more than one department. Notwithstanding the continued strain of the European situation, the exhibition, both from the point of view of attendance and of sales, was well in advance of that of the previous year.—Mr. John R. Findlay reported, for the Committee of the Royal Scottish Academy School of Painting, that as no applications for admission were received in response to the usual advertisement, they decided not to open a class for men or women. The lack of male students was likely to continue throughout the duration of the war. The council had to record the death of Sir William Turner, K.C.B., the Academy's honorary Professor of Anatomy, who had held the position for the long period of thirty-eight years. By the death of William Leiper, architect, which took place at Helensburgh on May 27, the academy lost a member of great and versatile talent. Reference was also made in the report to the late Charles Martin Hardie, who was a member of the academy, and whose pictures, "An Unrecorded Coronation—Inchmahome, 1548," "Robert Burns Reading His Poems to the Duchess of Gordon," and "The Meeting of Scott and Burns," brought the artist a wide reputation both at home and in our oversea dominions, where one of them found a permanent home. Dr. Joseph Anderson, the Academy's Honorary Professor of Antiquities, was a native of Arbroath, where he spent the first twenty-five years of his life. It was the publication of his great work, "Prehistoric Scotland," which gave Mr. Anderson a leading position in the archæological field of authorship and brought to him immediate and widespread recognition.—The report was approved, and office-bearers were elected, and the council for the ensuing year declared as follows:—Council—Sir James Guthrie, President; P. W. Adam, J. Lawton Wingate, G. Ogilvy Reid, J. H. Lorimer, A. K. Brown, Henry W. Kerr, Wm. D. M'Kay (secretary); James Paterson, librarian; Henry W. Kerr and John Kinross, auditors; P. W. Adam and G. Ogilvy Reid, curators of library; Robert M'Gregor, E. A. Walton, William Walls, Edwin Alexander, visitors of Academy's School of Painting; W. Birnie Rhind, John Kinross, E. A. Walton, D. Y. Cameron, Sir Robert S. Lorimer, Art College representatives.

ROYAL SCOTTISH PAINTERS IN WATER-COLOURS.—The annual general assembly of the Royal Scottish Society of Painters in Water-Colours was held in Glasgow last week, when the following office-bearers and members of Council were elected for the ensuing year:—President, E. A. Walton, R.S.A.; vice-presidents, A. K. Brown, R.S.A., and Edwin Alexander, A.R.S.A.; hon treasurer, A. B. M'Kechnie; members of Council in room of those retiring—James Riddel, J. Kent Richardson, Robert Eadie, A. N. Paterson, A.R.S.A., and Miss Norah Neilson Gray.

SCOTTISH ECCLESIOLOGICAL SOCIETY.—At the last meeting of this Society, held in St. Cuthbert's Halls, Edinburgh, Sheriff Scott Moncrieff read a paper on "The Church of Stanmore Parva, Middlesex," a church justly termed "unique," a distinction which it owes to Sir James Bridges, son of the eighth Lord Chandos, and himself created Duke of Chandos by George I. On the motion of Sir James Balfour Paul, Sheriff Scott Moncrieff was cordially thanked for his lecture, which was illustrated by lantern views. There was then shown the communion plate presented some years ago to the Church of Saughtree. In the absence of the parish minister, the Rev. W. Napier Bell, this was described by Professor Cooper. It was designed by Mr. F. C. Eeles, and was much admired.

LEGAL INTELLIGENCE.

UNLICENSED BUILDING WORK—CONTRACTORS HEAVILY FINED.—At Bow Street Police Court on March 13 Samuel Haskins and Bros., Limited, Maple and Co., Limited, and Frank Lewis Griggs were summoned for carrying on certain building and construction work upon premises at the corner of Coventry Street and Wardour Street without a licence from the Minister of Munitions, contrary to the Defence of the Realm Regulations; and Joseph Mendelsohn (otherwise known as Joseph Maxson) and Herbert Haase (trading as Taperell and Haase) were summoned for aiding and abetting them. Mr. Roome, who conducted the proceedings on behalf of the Director of Public Prosecutions and the Minister of Munitions, said that in July, 1916, a regulation was made under the Defence of the Realm Act prohibiting the carrying out of building or construction works without a licence from the Minister of Munitions, except in cases where the total cost did not exceed £500. The building in respect of which the proceedings were taken became vacant some months ago, and Messrs. Haskins applied for a licence to adapt the place for the business of a ladies' costumier at a cost of about £2,000, Mr. Maxson being described as the proprietor and Messrs. Taperell and Haase as the architects. Simultaneously another application in respect of the same premises to carry out work at an estimated cost of £3,000 was received from Messrs. Maple and Co. Both these applications were refused, as was a subsequent one by Messrs. Haskins for a licence for work estimated to cost £500. Then Messrs. Haskins wrote stating that they would not trouble the Minister of Munitions further, as the plans had been modified so as to reduce the cost of the proposed work to £450. It was afterwards found, however, that works were in progress, the total cost of which must considerably exceed the £500 limit. Eventually, without prejudice to possible legal proceedings, permission was given for the work to be completed under certain conditions. The only extenuating circumstance in favour of the defendants was that this was the first prosecution that had been instituted under the regulation, but it was hoped that it would be a warning to all building contractors and others who might be disposed to defy the law. The defendants pleaded guilty, and, through their respective counsel, pleaded the complexity of the regulations, which it was difficult for a layman to understand. Mr. Graham Campbell said he did not overlook the fact that this was the first case of its kind, and that the defendants, therefore, had had no warning from the experience of others. At the same time a serious offence had been committed, and small fines would not have a deterrent effect on men in the financial position of the defendants. He fined Mendelsohn £100, Messrs. Haskins and Messrs. Maple each £75, Griggs £50, and Haase £25. Each of the defendants, in addition to the fines, must pay £5 5s. costs.

TRADE NOTES.

Mr. E. Guy Dawber, architect, is leaving 22, Buckingham Street, Adelphi, and removed to 38, Sackville Street, Piccadilly, W.

Boyle's latest patent "air-pump" ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, E.C., have been employed by the N.E. Marine Engineering Company, Ltd., Engineering Works, South Dock, Sunderland.

Messrs. John Tann and Co., Ltd., of 117, Newgate Street, E.C., have issued a new price list of their safes and strong rooms in English, French, and Spanish. This is taking time by the forelock to some purpose. There will be plenty of work in France and Spain presently for English architects and builders, and those who want to share it will do well to secure a copy of this list for the benefit of their prospective clients. It embraces all the firm's well-known specialities, and the back page contains some useful directions for ordering by cable.

The death took place on Sunday, at the age of 74, of Mr. Alexander Thomson, superintendent of works at Osborne House.

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COMPETITION.

OLDHAM.—The Health Committee invite competitive designs for a proposed nurses' home at Westhulme from architects practising within the borough. A plan of the site may be seen and instructions and suggestions for the guidance of architects may be obtained on application at the borough surveyor's office. Premiums of £15, £10, and £5 respectively will be awarded to the authors of the designs which are selected as first, second, and third in order of merit. Competitive drawings, with sealed letter containing the name and address of the author, to be delivered under cover at the borough surveyor's office not later than April 24, endorsed "Design for Nurses' Home."

PARLIAMENTARY NOTES.

CHARING CROSS BRIDGE.—At a quarter past eight o'clock on the 13th inst. the second reading of the South-Eastern and London, Chatham, and Dover Railways Bill, empowering the companies to strengthen Charing Cross Bridge, was moved. Sir W. Essex (L., Stafford) moved the rejection of the measure on the ground that it would sanction the perpetuation of an erection which was nothing less than a monstrosity and would divert labour from more important work than the reconstruction of the bridge in time of war. Mr. J. D. Gilbert (L., Newington, West) seconded the motion for rejection. Mr. Joynson-Hicks (U., Brentford) supported the Bill. He said that its opponents, while abusing the company, denied it any opportunity of improving itself. The bridge required supporting, and it was in the interests of the counties of Kent and of Surrey and of our great Imperial traffic that the company should be allowed to strengthen the bridge. He was not going to say the bridge would fall down if not strengthened, but an improvement in its carrying capacity was needed. He was authorised by the Railway Company to say that, as a condition of the passing of the Bill, they were prepared to accept a clause providing that, in the event of the larger scheme for the removal of Charing Cross Station to the other side of the river being proceeded with in the course of the next ten years, a sum of £157,000 should be deducted from the amount payable to the company by way of compensation. Mr. John Burns (L., Battersea) said he had promised that he could bring the opinions of public bodies in support of the view he had previously expressed against the Bill, and he maintained that by meetings at the Mansion House and at Spring Gardens he had been able to do so. Everywhere, he said, it had been acknowledged that Charing Cross Bridge was unsightly, and that Charing Cross Station was inadequate and inconvenient—a fault which could only be remedied by transference to the South side of the river. Even if the bridge was strengthened nothing could get over the fact that further siding accommodation was required, and, owing to the increase in the weight of locomotives, that ought to be done on the solid earth and not on a bridge. At present it was impossible to get either the labour or the steel to strengthen and widen Charing Cross Bridge, and although the company were pledged to do nothing during the war, they were exploiting the war for their own ends. The idea of the bridge being structurally unsafe was not true. London had made up its mind to have the Charing Cross Bridge removed. When the bridge was removed a space would be left for the erection of a new bridge for vehicular traffic, and on the South side of the river, in conjunction with the South-Western Railway Company, there could be provided a railway terminus on the models of St. Pancras or Euston. Let them look to the example of Paris and see what a great city could do in the matter of bridges. One day's cost of the war would finance a scheme worthy of the engineering traditions of the race and provide a monument appropriate to the sacrifices which London and her sons had made to the war. Mr. G. Roberts (Parliamentary Secretary to the Board of Trade) said if the House read the Bill a second time it would not hinder or hamper the larger project to which Mr. Burns had referred. The bridge in its present state could not be used to its fullest extent, and the company were taking a wise precaution in asking the House to give them facilities for putting it in a proper state of repair. It was a form of waste to have a bridge in existence which could not be used with a due regard to the public safety. The Board of Trade asked the House to read the Bill a second time and to refer it to a Select Committee, where its details could be properly discussed. Mr. Dickinson (L., St. Pancras, North) submitted that after the decision come to by the House last year the company should have recognised that it was their duty to see whether they could not devise some better plan, which would conform to the wishes of the great mass of Londoners. Mr. Burdett-Coutts (U., Westminster) said the Westminster City Council, representing the locality most concerned, had requested him to support the Bill, having regard to the vital and immediate importance for the City of Westminster of adequate railway facilities. He had been rather amused by the letter in *The Times* signed by representatives of the artists, æsthetics, poets, and the people who like to be looked upon as combining those three things in themselves. Mr. Thomas (Lab., Derby) thought that the Bill ought to be given a second reading. There was no alternative scheme to the Bill, but only suggestions of an imaginary state of things which might come into being in the future. Lieutenant-Colonel Sir R. Williams (U., Dorset, W.) supported the Bill, and Mr. Peto (U., Devizes) spoke against it. On a division the second reading was carried by 184 votes to 56—majority for, 128.

HOME-GROWN TIMBER.—Sir R. Winfrey (Secretary to the Board of Agriculture) informed General Sir Ivor Herbert (L., Monmouthshire, South), last Friday, that it has been necessary to transfer to the War Office the work and staff of the Home-grown Timber Committee. It is necessary, consequently, to dissolve the Committee, which was set up in November, 1915, and which by the end of last month had acquired approximately 29,000,000 cubic feet of standing timber. The number of men employed was about 5,800. This included 2,632 men of the Canadian Forestry Corps and 830 prisoners of war. The number of mills in operation at the end of February was 150, of which sixteen were Canadian. The total output of sawn timber by the Committee was approximately 9,000,000 cubic feet. Of this, 3,000,000 cubic feet was produced by the committee's own mills, 2½ million cubic feet by the Canadian Forestry Corps, while the balance has been supplied by contractors. In addition, a large amount of pitwood has been produced, and it is on this class of work that the German prisoners have been employed. The principal articles supplied by the committee were: Sleepers (all kinds), 2,500,000; scantling and boards, 4,000 standards; pitwood and poles, 50,000 tons.

HUTS IN A WHEATFIELD.—Mr. Lough (L., W. Islington) asked last Friday for the setting-up of some effective form of machinery for the more economic administration of the resources of the country. He urged that the Government should call the House of Commons to their assistance in devising schemes of economy. He suggested that a Committee of the House should be appointed to consider the national expenditure with a view to economy, subject to the condition that the principle underlying any purchase should not be inquired into, and that the investigations of the Committee should not cause delay to any military operations. That morning the third, and very interesting, article in the *Times* told the story of a military officer who ordered hutments to be erected in a wheatfield of 22 acres, though on the other side of the road there was a field where they could have been put up without any agricultural loss. (Mr. Faber (U., Clapham): "It is too bad.") On another page of the *Times* it was related that another agent of the War Office refused a farmer hay, with the result that the farm would remain unstocked and uncultivated for the next six or eight weeks. These things shocked the country. (Hear, hear.) The War Office was the worst offender. Soldiers, owing to their profession, were not men well calculated to carry through a simple business operation. There appeared to be no authority over the War Office. He was grieved to know that there was still much waste.

The Bishop of Durham has dedicated at Shildon the first war shrine erected in the South Durham colliery district.

As memorials of those who have fallen, it is proposed to place in St. Nicholas Cole Abbey a number of pictorial representations of the Way of the Cross. "I have made inquiries," writes the Rector, "of the representatives of the one great Church decorator of recent days—William Morris, the inheritor of the Burne-Jones tradition—and I find that we could have them most exquisitely executed by Henry Dearle, the pupil and fellow-worker of those two great artists, in a low carved relief in wood and gesso—the most beautiful and enduring of modern materials—with all the richness of golding and colour which would be in keeping with our Church."

Our Office Table.

The Civil Service Estimates for the year ending March 31, 1918, in respect to public works and buildings amount to £2,831,894, a net decrease of £211,688 on the year 1916-17. Following last year's expenditure of £10,000, a further £8,000 is required for the repair of the roof of Westminster Hall. Provision is made in Civil Service Estimates for the maintenance of the Embassy houses at Berlin, Vienna, and Constantinople, and the Legation buildings at Brussels.

Mr. E. H. Sedding, in a note to the last of a series of articles on "The Old Towers of Cornwall," which he has been contributing to the *Truro Diocesan Magazine*, says:—"An eminent writer has stated that many pinnacles in the West were purposely built leaning outwards. We cannot agree with this, as it would be bad building, and the action of the bells would soon render their stability dangerous both to the church and parishioners. The experience of the optical illusion is this, specially with regard to earlier and simple moorland structures where buttresses are seldom found. The walls were built with an inward batter, whereas the pinnacles and parapet were erected upright, so that the predominant battering lines, which to the ordinary observer appear vertical, end abruptly at the base, or string course, from which the pinnacles and parapets rise. The vertical lines of the latter not being continuous with the lines of the walls below seem to the casual observer to be actually leaning away from the main walls. It is not so noticeable where buttresses occur, and in late fifteenth and early sixteenth century towers the main walls and the parapets and pinnacles both were built vertical."

A third edition of a "Manual of Reinforced Concrete," by Charles F. Marsh, M.I.C.E., and William Dunn, F.R.I.B.A. (475 pp. London: Constable and Co., Ltd. 10s. 6d. net), is practically re-written. Since its first appearance a standard notation of formulæ has been adopted by the London County Council in their "Regulations" and by the R.I.B.A. Joint Committee, and its advantages are obvious. The authors have therefore recast their book in accordance therewith. They have also added much new and useful matter—the methods of finding the bending moments on continuous girders; of calculating arches with three and two hinges, and the flat-slab or mushroom floor; new diagrams for the design of columns and T beams; a discussion of electrolysis, and expansion and contraction of reinforced concrete structures are included. As a result the book has grown from 290 to 475 pages, not one of which is wasted. The steady demand for the previous editions will, we predict, considerably increase for this, and deservedly; for it is in many respects without its equal as a complete manual of its subject.

During the course of a meeting of the Walsall Town Council last week, the gas committee offered to allocate £4,000 in relief of rates out of current profits. Mr. Thickett, a Labour member, was opposed to these grants in relief of the rates.—Mr. Llewellyn said there never was a greater need for the trading departments of the corporation to do what they could to obviate as far as possible the serious increases in the rates of the borough which had been foreshadowed.—Mr. Tucker said there was no certainty that the gas undertaking would show a profit of the amount in question, and Mr. Venables (chairman of the committee) added that he was opposed to the committee offering more than £2,000, as there were extraordinary expenses which had to be incurred this year amounting to over £5,000.—The report was approved. Walsall is luckier than London, anyhow! Cheap gas and relief from rates is not one of the "advantages" guaranteed by gas companies.

The Minister of Labour has appointed the following to be a committee to advise and assist the Employment Department of the Ministry upon matters affecting workmen in the building trades in connection with the working of employment exchanges:—Messrs.

J. Batchelor, operative bricklayers; J. Bradshaw, operative stonemasons; F. T. Chandler, amalgamated carpenters and joiners; J. H. Edmiston, operative plumbers; Charles Ince, labourers; Kinniburgh, electricians; T. H. Otley, operative plasterers; Parsonage, amalgamated painters; J. Vickers, heating engineers; W. Wentworth, wood-cutting machinists; and A. Wilson, operative slaters. It is proposed in due course to take steps with a view to forming a corresponding committee of employers.

Miss Olga Hertz, chairman, and Mrs. E. D. Simon, hon. secretary, of the Manchester and Salford Women Citizens' Association, write from 20, Mount Street, Manchester:—May we call attention to the very serious situation that is being caused by the shortage of housing accommodation in Manchester and to a possible remedy? The normal rate of increase in houses in the city is 1,500 a year, and the suspension of practically all building has meant that nearly every house fit to live in is occupied. The City Council are unable to proceed with their housing schemes, and the pressure will get steadily worse until building on a large scale can be resumed. Meantime there is a very large number of empty shops in the city, as small businesses are closing down every day. Many of the shops will probably never be used for business purposes again. In Chorlton-on-Medlock and Didsbury such shops are being used as dwelling-houses, a complete row of shops in Chorlton-on-Medlock having been so converted. The shortage has become acute in Bradford during the last fortnight. The occupiers of forty-six houses and nine shops built on an area needed for the extension of a large works engaged on munitions have been given notice. Several of them are quite unable to find other houses to move into. The rents of shops, of which there are a number vacant in the immediate neighbourhood, are prohibitive. We would suggest that landlords should consider letting these premises, where there is no immediate prospect of their being wanted as shops, at a dwelling-house rent, on an undertaking by the occupiers that they should not be used as shops. The use of unoccupied shops as dwelling-houses would relieve the pressure for some time to come.

In spite of the war the improvements at Delhi are progressing. A lay-out has been sanctioned for a large portion of land until recently occupied by the Indian Infantry Lines in the Old Dasya Gunj Cantonment. One portion set free will, it is stated, be utilised for a number of buildings for educational purposes, while the other will form the site for shop and residential buildings. Considerable progress is also being made in the opening up of communications in the city, where good work has been effected in the development of the Burn Bastion Road, while a commencement has been made with the extension work of the road passing from the Lahore to the Ajmere Gates. Other improvements include the completion of the new road leading from the railway bridge over the Jumna to the Calcutta Gate, and which will be shortly thrown open to the public.

There is always an interest attaching to the exhibition of works by members of the Glasgow Art Club which is not evident in ordinary shows in the West of Scotland by reason of the fact that the nature of the occasion affords artists an opportunity of demonstrating phases of their art which are not familiar through the usual public channels. Thus one sees less of the type of picture "characteristic" of particular artists, and consequently there is a freshness of treatment and variety which appeal to the visitor. The spring exhibition, which opened on Monday, provides an example of this, and the result is a collection of exceptional attraction. There are several excellent portraits, and the general collection contains many paintings of high achievement.

Major Courthope, M.P., President of the English Forestry Association, writing from the House of Commons, appeals to landowners to assist the output of home-grown timber. The association has undertaken to collect information and to assist in organising private effort. Information is urgently needed on the following points:—

(1) The names and addresses of everyone of experience, timber experts, foresters, and also skilled sawyers or woodmen in private employment, whose services could be available (by arrangement with their employers) for part of whole time employment in their own districts as organisers, supervisors, valuers, etc., or also for instructing unskilled men, provided by the Director of National Service.

(2) Haulage, whether mechanical or horse, and also skilled hauliers, which could be available by arrangement, for part or whole time work, and particularly for hauling pitwood cut into lengths.

(3) Estate sawmills which are not employed to their fullest capacity. (Information on this point should include particulars of the engine and benches, distance from rail, number of additional men required to secure maximum output, and class of timber available on the estate or in the immediate neighbourhood.

If owners will forward information on these subjects to the hon. secretary, English Forestry Association, Farnham Common, Slough, Bucks, they will render a most useful service. The information will be classified and placed at the disposal of the Directors of Timber Supplies and National Service.

The plans for the reconstruction of the interior of the Canadian Parliament buildings include arrangements for a hall to be used for commemorating the great deeds of Canada and the Allies in the present war and for the accommodation of the colours of the various regiments of the Dominion that have so gallantly participated in the fighting. This Hall of Fame, which will be practically a Canadian Westminster Abbey, will run the whole depth of the building. Along the wide and spacious corridor will be niches for the erection of statues. The walls are to be utilised for the portrayal of scenes associated with the cause for which the various nations are at present fighting.

At this moment of need for the fullest organisation of our national resources, any methods by which the maximum productivity are being obtained from existing material are of paramount interest. Mr. Cecil Walton, in his pamphlet, "Welfare Study, What it is" (Maclure, Macdonald and Co., Glasgow, 6d. net), claims, with apparent justice, to have discovered such means with regard to the human element in the large industrial concerns with which he is connected. As manager of a large National Projectile Factory, and as one who has been intimately associated with many great schemes for speeding up our munitions output, his conclusion, "Welfare! it pays, Sir! every time," cannot be lightly dismissed. By "Welfare Work" Mr. Walton does not imply alone the protection of the interests of women employees, and he is emphatic in his disclaimer that "Welfare" "does not merely mean canteens, chairs and pianos." These things, he maintains, are rightful adjuncts—the fringes, as it were, on the garment of proper supervision; but welfare work, embracing such matters, implies the provision of suitable surroundings for the task in hand. It means, says the author, the creation of an "atmosphere" by which the old-time barrier between employer and employee disappears. "It is the surest way to speed-up output; swift praise, swift blame and punishment" are among its essential parts. Incidentally, the recreation and food of employees, as well as ambulance-work in the factory, are touched upon in this brochure, and the reader is reminded that he may obtain further information upon the subject by applying to the Ministry of Munitions, Welfare Section, 6, Whitehall Gardens, London, S.W.

Blasting with liquid air is said to have been rapidly developed in Germany since the beginning of the war. Holes drilled in rock are charged with five cartridges, which are simply small bags soaked in a bucket of liquid air after they have absorbed a sufficient amount of it, when they are jammed, like wet rags, into the drill-hole with a stick, and fired by electricity. A single 90-grain cartridge costs approximately 6s. 10d., as much as an equivalent dynamite cartridge. It is said to be 50 per cent. more powerful than dynamite, and the cost just about one-half as much in large quantities.

The apparatus installed by the United States Bureau of Standards for testing the resistance of structures and materials to fire is housed in a steel frame building, the materials to be tested being built within heavy steel frames. A furnace, with an open face, measuring 16 ft. by 20 ft., and burning fuel oil blown in by a steam jet, supplies the various temperatures, which are measured by suitable apparatus. The frame containing the panel to be tested is swung by means of a crane in front of the furnace. The heat is then accelerated, and after a definite length of time the panel is drawn away, and while it is still hot a stream of water is played upon it—providing, of course, there is anything left of it after the fire test—under 80-lb. pressure, through a 1⅛-in. nozzle.

The latest acquisition of the National Gallery is a fine half-length portrait of a man by Romney. It represents James Mingay, K.C., in wig and gown, seated, with a bundle of papers on a table, and a red background. It was painted in 1786, engraved by C. H. Hodges in 1791, and sold at Christie's in 1902. At present it hangs on a screen, back to back with the Herkomer portrait of Lord Kitchener, temporarily transferred from the National Portrait Gallery.

At the annual general meeting of the Corporation of British Columbia Land Surveyors, held at Victoria recently, the statement was made that about 40 per cent. of the surveyors of the province are now on active service, as well as a large number of their former pupils and assistants. It was unanimously decided to extend assistance from the funds of the corporation (where necessary) to members who are serving with the Forces or their dependents. The following officers were elected for 1917:—President, N. F. Townsend, Vancouver; vice-president, S. S. McDiarmid, Vancouver; secretary-treasurer, W. S. Gore, Victoria; board of management, Messrs. O. B. N. Wilkie, F. C. Green, W. S. Drewry, John Elliott, and E. B. Hermon.

TO ARMS!

1st LONDON ENGINEER VOLUNTEERS.
Headquarters, Bakerton Street, Oxford Street, W.

OFFICER FOR THE WEEK.—Platoon Commander C. E. Campbell.

NEXT FOR DUTY.—Platoon Commander Watkins.

MONDAY, March 26.—Technical for Platoon No. 9 at Regency Street. Squad and Platoon Drill. Platoon No. 10. Signalling Class. Recruits' Drill, 6.30—8.

WEDNESDAY, March 28.—Instructional Class, 8.15. Platoon Drill, Platoon No. 2.

THURSDAY, March 29.—Platoon Drill, Platoons Nos. 5 and 6. Ambulance Class by M.O., 6.30. Signalling Class.

FRIDAY, March 30.—Technical for Platoon No. 10, Regency Street. Squad and Platoon Drill, No. 9. Recruits' Drill, 6.30—8.30.

SATURDAY, March 31.—Commandants' Parade, 2.45, Uniform, for Drill in Hyde Park.

SUNDAY, April 1.—Special Work at Bombing School. Parade, Clapham Common Station (City and South London Tube Railway), 9.45 a.m. Uniform, haversacks, water-bottles. Midday rations to be carried. As this work is very important, the Commandant would like to see much larger parades.

EASTER TRAINING.—Will be at Esher. Special technical instruction will be given for the first hour to all Platoons on their respective drill nights in order to prepare them for the course which has been arranged.

MUSKETRY.—For all Companies, see Notice at Headquarters.

NOTE.—Unless otherwise indicated, all Drills will take place at Headquarters.

By Order,
MACLEOD YEARSLEY,
Captain and Adjutant.

March 22, 1917.

The export of cement from Denmark is now officially prohibited.

The death occurred on Tuesday, March 13, at his residence, Park Hill House, Croydon, of Mr. Baldwin Latham, engineer and surveyor, of Parliament Mansions, Westminster, in his eighty-first year.

Official news has been received that Driver Thomas Lewis, of the 136th Siege Battery, R.G.A., of 2, Paddock Head, Smithy Bridge, died from illness at the front on February 7. He had completed nearly two years' service in the Army, and his 50th birthday occurred whilst he was at the front. Before enlisting he was employed as a bricklayer for Messrs. W. Henderson and Son, of Littleborough. He has left a widow and one son, who is also a bricklayer.

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TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

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NOTICE TO OUR READERS.

Solely to economise paper, the price of this journal is now raised to *Sixpence* until the war is over, or till the present scarcity and high price of paper ceases.

If, as at present seems but too probable, further restrictions as to supply are forced upon us, we shall have to diminish its size, but we are loth to do this while enough paper is obtainable, even at loss to ourselves.

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T. R. S.—Please send.

L'ESPOIR.—Sorry; but out of our power.

DATELESS.—Probably about 1870, writing from memory. 2. Yes.

SYMPATHISER.—Many thanks. As you say, it matters little to papers of small sale which only use a ream or two of paper a week; but it is very hard on ourselves and similar journals, especially as we are only allowed half the amount we were permitted to have *last year*. Had it been half of what we were using in 1914, we could have managed somehow.

The Belfast branch of the Auctioneers and Estate Agents' Institute invite tenders by the 31st inst. for the erection of a number of semi-detached houses, plans and specifications of which are obtainable from the architect, Mr. W. J. Walshe, 37, Royal Avenue, Belfast.

By a majority of 40 to 3, the clergy of the East Deanery of the City of London and the various churchwardens have accepted the Bishop of London's proposal to close a majority of the City churches on Sundays during the war. The number of the churches to be open in the East City is 10.

The dispute over pictures bequeathed by the late Sir Henry A. Layard was last Friday withdrawn from the House of Lords, the Attorney-General stating that the Treasury would pay the appellant, Major M. Layard, a sum of money, and the National Gallery would retain the pictures.

The largest dam in Europe was recently completed near Barcelona, Spain. Abutting on almost perpendicular cliffs, the dam is constructed of concrete and measures 330 ft. in height and 700 ft. in length. The thickness is 320 ft. at the base, gradually decreasing to 14 ft. at the top. The valley above the dam is now occupied by an artificial lake 15½ miles long and 3¾ miles wide.

The committee of the Belfast Soldiers and Sailors' Service Club have secured premises in Waring Street, which it will be necessary to alter. Mr. Wm. Dowling, contractor, Cromwell Road, Belfast, has secured the contract. The plans have been prepared by the hon. architect, Mr. R. J. Calwell, Scottish Temperance Buildings, Belfast, and the work will be carried out under his supervision.

Mr. George H. Dawson, surveyor-general of British Columbia for the past five years, resigned that office at the end of the year, to resume private practice. Mr. Dawson, who has been a resident of Vancouver for over twenty-seven years, was appointed to reorganise the provincial department, and handled it through the big land boom, when the staff of surveyors had to be increased from less than a dozen to over sixty.

The contract for the substructure of the proposed combination railway and passenger bridge on the St. John Valley Railway in New Brunswick, across the Nerepis River, has been awarded by the Department of Public Works to Messrs. Powers and Brewer. The bridge will be four spans in length, and all the substructure is to be of stone and concrete, entailing some work of a difficult character. The contractors are starting work on the substructure without delay. Their contract price is between $60,000 and $70,000.

LIST OF TENDERS OPEN.

BUILDINGS.

March 29.—Alterations and additions at St. Ishmaels Council schoolhouse.—For the Pembrokeshire Education Authority.—Drawings and specifications may be seen and forms of tender obtained on application to the Clerk of Works, County Education Offices, Haverfordwest, or from the Head Teacher at the Schoolhouse. Tenders to the Clerk to the Education Committee.

April 2.—Erection of an Office in brickwork for their traffic controller at Adelaide Station, near Belfast.—For the Great Northern Railway Co. (Ireland).—T. Morrison, Secretary, Amiens Street Terminus, Dublin.

ENGINEERING.

April 30.—Installation of a Vacuum Steam-heating System, and Supply and Erection of Powerhouse Buildings and Chimney.—For the Canterbury University College, Christchurch, N.Z.—The Registrar of Canterbury College, Christchurch, N.Z.

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

FENCES AND WALLS.

March 30.—Wrought-iron Gates and Fencing, for the Central Wharf and Quay Street Landing, Auckland, N.Z.—For the Harbour Board.—The Commercial Intelligence Department, 73, Basinghall Street, E.C.

PAINTING.

March 21.—External Painting and Repairs and Internal Cleaning at the South-Eastern Ambulance Station, New Cross, S.E., and Repairing and Distempering Ceilings at the Downs Sanatorium, Sutton, Surrey, in accordance with specification prepared by Mr. T. Cooper, M.I.C.E., M.I.M.E., acting Engineer-in-Chief.—For the Metropolitan Asylums Board.—Specifications and forms of tender may be inspected at the Office of the Board, Embankment, E.C. D. Mann, Clerk.

ROADS AND STREETS.

March 22.—Supply of about 2,980 yards of Flints, about 2,550 yards of Granite or other stone, and 60 yards of Gravel.—For the Chailey Rural District Council.—H. Kemp Walls, District Surveyor, North Common, Chailey.

March 24.—Road Metalling in quantities and at times as the Council may desire.—For the Pontardawe Rural District Council.—Forms of tender to be obtained at the Council Offices, Pontardawe. Sealed tenders, Mr. W. Lewis, Clerk.

March 24.—Broken Granite, Tarred Slag, and Hire of Steam Roller (One Year).—For the Dorking Urban District Council.—W. J. Hodges, Clerk, Council Offices, Dorking.

March 26.—Materials and Team Labour in the several parishes in the district of Docking (Norfolk) (One Year).—For the Docking Rural District Council.—J. A. Stoughton, Clerk to the Council, Fakenham.

March 27.—About 1,100 tons of Granite, to be delivered at Headcorn, Pluckley, Charing, Ashford, Hothfield Railway Stations and Great Chart Siding.—For the West Ashford Rural District Council.—Tenders to the Chairman of the Rural District Council, Union House, Westwell, Ashford.

March 27.—Materials, etc., within the district of West Malling (One Year).—For the Malling Rural District Council.—Fredk. J. Allison, Clerk, Council Offices, West Malling.

March 30.—Granite, Blast Furnace Slag, Tarred Blast Furnace Slag, Kerbs and Setts, Stoneware Pipes and Gullies, Bricks, Cement and Lime (One Year).—For the Cannock Urban District Council.—R. Blanchard, Engineer and Surveyor, Council Offices, Cannock.

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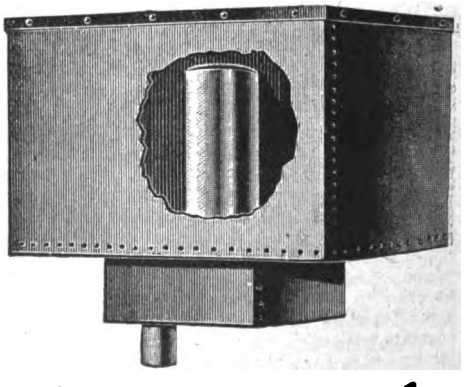

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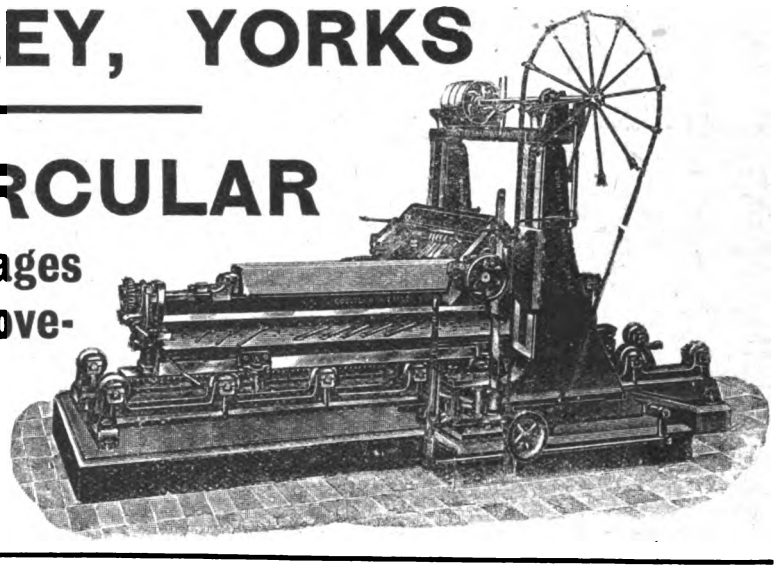

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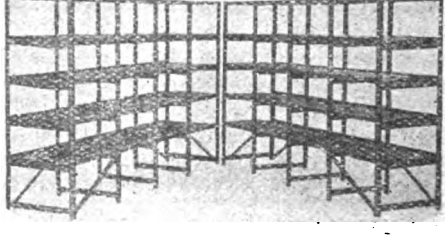

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March 28, 1917. Volume CXII.—No. 3247.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.2.

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OUR ILLUSTRATIONS.

House at Hinderton, Neston, Cheshire. View of Entrance Front and Interior of the Hall, with plans. Messrs. Briggs, Wolstenholme, and Thornely, FF.R.I.B.A., Architects.

Muchelney Abbey, the Abbot's House, near Crewkerne, Somersetshire. Measured drawings, plans, and details by Mr. James Macgregor, Architect.

Ashcroft Manor, British Columbia. Plans, elevations, and section. Mr. Leonard Martin, F.R.I.B.A., Architect.

Currente Calamo.

Week by week from every populous centre come reiterated complaints of the shortage of houses. At Birmingham last week the Lord Mayor presided over a conference of the Town Planning Committee, the Public Health and Housing Committee, and the Housing Enquiry Committee, and it was officially reported that there was a serious shortage of houses in the city. It was decided to recommend the transfer of the administration of Part 2 of the Housing Act (Demolition and Renovation) from the Health Committee to the Town Planning Committee, which already deals with Part 1 (clearing of slum areas) and Part 3 (the acquisition of land for building purposes. The Town Planning Committee are completing a survey of the city, and are in possession of much information as to building areas, and it is felt that the control should be under one body. So far, the Town Planning Committee has hardly facilitated house-building. At Huddersfield, in presenting the estimates at the meeting of the Huddersfield Town Council, Alderman Woodhead pointed out that although new workshops were being built there were very few new houses. The town could not long endure the overcrowding caused by the influx of workmen and their families or the evils which overcrowding, if long continued, always created. He felt that those who had placed new factories within the borough recently ought to erect workmen's dwellings at the earliest possible date. The council were unable to provide anything like the number of houses required.

As will be seen by an advertisement on another page, the Director of Timber Supplies has decided to institute a monthly census of stocks; and, under the Defence of the Realm Act it is intimated to all timber merchants and to large consumers of timber that they should submit a monthly return of all stocks of soft woods, including pitch pine, sleeper blocks, poles, and pit-props held by them on the last day of each month. The return will be due on the 5th of the month following. A form by the 26th must apply to the office merchants and large consumers, with full instructions, on or before the 25th of each month, and any firm not receiving this form by the 26th must apply to the office of the Director of Timber Supplies, Caxton House, Westminster, for a copy. These instructions do not apply in cases where the stock is less than five standards, nor to stocks of pit-props and pit-wood in the hands of colliery owners.

Sanction has been given by the War Cabinet to the scheme put forward of establishing a National War Museum, and a committee has been appointed to carry out the project. The First Commissioner of Works will act as the Chairman of this body, having as his colleagues Sir Martin Conway as the Director-General, Commander C. C. Walcott as the representative of the Admiralty, Mr. B. B. Cubitt, C.B., assistant secretary of the War Office, as the representative of that Department; Colonel J. R. Stansfield, C.B., the chief technical officer of the Department of Munitions Inspection, as the representative of the Ministry of Munitions; Mr. Ian Malcolm, M.P.; Professor C. W. C. Oman, Chichele Professor of Modern History, Oxford; and Mr. C. J. Ffoulkes, the curator of the Tower of London Armouries, who will act as curator and secretary. The object is to collect and preserve for public inspection objects illustrating the British share in the war. The exhibits will comprise examples of the arms and other war materials used by the British naval and military forces, trophies captured from the enemy, souvenirs found on battlefields, inventions connected with munition making at home, the literature and art of the war (including regimental magazines and trench drawings), maps, the music of the war, placards issued by the Government in connection with recruiting, economy, and loan campaigns, medals and decorations, flag-day souvenirs, and autograph letters of some of those who have taken distinguished parts in the war. It is hoped that all persons and public bodies who have objects of national interest connected with the war will communicate with the Secretary, National War Museum, H.M. Office of Works, Storey's Gate, London, S.W., but no article intended for exhibition should be forwarded before the secretary has been communicated with. So far, we believe, the location of the museum is not settled. We hope it will be installed in a suitable permanent building in some central locality, and not, as has been suggested, in the Tower of London.

In view of the recent death of William de Morgan, a small loan collection of his pottery and tilework has been arranged in Room 132 of the Victoria and Albert Museum. In the present difficulties of transport, no attempt has been made to form an exhaustive, or even a representative, series of these wares; a number of the choicest specimens have been, as a matter of fact, detained in Paris since the Arts and Crafts Exhibition of 1914; the exhibits are, therefore, mainly confined to loans from residents in London and the neighbourhood. Mr. Halsey Ricardo has kindly assisted in the organisation. Both types of de Morgan's productions are represented, namely, the ruby-coloured and silver-yellow lustre-ware, emulating the Italian majolica of Maestro Giorgio of Gubbio, and that painted in rich harmonies of blue, green and purple, the so-called Persian colours, suggested in reality by the work of the old Damascus potters. The collection testifies to the late artist's wonderful fertility in the invention of designs, and proves that he fully understood the value of the art of the past as a stimulus to new creation, rather than a repertory of themes to be slavishly copied. The opportunity has been taken to show in the same room a small series (also kindly lent) of the stoneware made at Southall by the three brothers Wallace, Walter, and Edwin Martin (of whom only the first-named, the eldest, survives). This belongs, of course, to a very different category of the potter's art. Here the inventiveness of the artist is displayed in a great variety of form, always, however, strictly within the natural limits of the craft, and in exquisite subtleties of proportion and of full, though sombre, colouring. The exhibition is supplemented by a few examples of modern pottery and porcelain, both English and foreign, drawn from the permanent collections of the Museum. Amongst these may be specially named specimens of French stoneware by Jean Carriès, Delaherche, Bigot, Lenoble, and others, recently received by the Museum as a joint gift from Prince Antoine Bibesco and Monsieur Paul Morand.

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Between the Apennines and the Adriatic lie the ancient hill-cities and ports described in "A Holiday in Umbria," by Sir Thomas Graham Jackson, Bart., R.A. (Murray, 10s. 6d. net). The author has made several visits to both shores intent on the study of classic and mediæval architecture In this volume are included Pesaro and Ancona and Rimini, and the duchy of Orbino, with its famous ducal palace. Drawing on Sir Thomas Hoby's translation, as edited by Sir W. Raleigh, an admirable picture of the ducal Court of Guidobaldo is presented by Sir Thomas Jackson. "There is, perhaps," he observes, "no other book that brings the reader so intimately into touch with the living men and women of four hundred years ago." Of the ducal palace as it now is, and as it was when a sumptuous treasury of manuscripts, paintings, sculptures, tapestries, and other products of art, collected by Duke Federigo, Sir Thomas gives an account that shows how splendid was the setting in which this splendid society lived. The drawings and plans of the palace will be greatly appreciated by all who study the architecture and sculpture of the building. Sir Thomas succeeded, by the way, in discovering the birthplace of the original architect—"the eminent maestro Lutiano," as he is named by Federigo Luciano of Laurana, as he is called by Raffaello's father in a contemporary poem, was born in 1420 at Vrana, in Dalmatia, a place some twenty miles south of Zara, now in ruins. The frontispiece is a drawing of Ancona by the author, reproduced in colour, in which what Sir Thomas Jackson considers "the most beautiful of all Roman arches" dominates the composition.

In some parts of the United States unofficial reports have indicated severe restraint on building operations in consequence of the rising cost of labour and materials. The whole country, however, according to official data so far as they have been received, shows for the year 1916 moderate gains, these gains being more moderate at the end of the year than in the early part, while returns for January, 1917, were still more moderate. From 158 cities reports received for *Bradstreet's* issue of February 17 showed in January a gain in permits of 5.8 per cent. and in expenditures of 4.1 per cent. over January a year ago. These gains compared with gains in expenditures of 5 per cent. in December and 3.6 per cent. in November. Three groups of cities showed declines. These were New England, middle, and north-western cities, the gains to offset them being made in the other groups. Of the large cities, New York showed a decline of 20.9 per cent. in expenditures from January a year ago; Boston, a decline of 12.2 per cent.; Cleveland, 13.1; Chicago, 40.7; Milwaukee, 87.7. Large cities which made gains were Philadelphia with 15.3 per cent., Detroit with 62.8, Toledo with 84.2, St. Louis with 338 per cent., Hartford with 578 per cent., Washington with 77 per cent., San Francisco with 71.2, and Los Angeles with 180.

In America they are beginning to "scrap" statues. On one of the most prominent sites in Washington there stands a bronze statue of Admiral Samuel F. Dupont, a popular officer of the navy during the Civil War. It was erected in 1884 at a cost of £2,000. As a work of art it has often been severely criticised. "It lacks silhouette." "It is badly composed, stiff, without a touch of nature." "It has no swing to it, no character." "It looks more like a wooden Indian than anything else." "It does not stand on its feet, and has no more nervous quality than a mannikin." Such are the opinions of various present-day experts. It is, therefore, scarcely surprising, according to the *Manchester Guardian*, that Congress has decided that the statue shall be removed, but the remarkable thing is that another figure of Admiral Dupont is to take its place, and that the cost of the substitute is to be voluntarily borne by present members of the Dupont family.

The flight of artists and art dealers from the war centres of Europe to America is compared by one fanciful American writer to "a similar flight from Byzantium to Florence, after the Turks occupied Constantinople in the fifteenth century." One of these, Elie Nadelman, the Polish sculptor, seems, at any rate, to have made his mark in New York. One of his most interesting quoted utterances deals with the respect which an artist owes to the peculiar nature of the material in which he works. "A rough stone," Nadelman says, "will refuse all the positions we may wish to give it if these are unsuited to it. By its own will it falls back into the position that its shape in conjunction with its mass demands. Here is a wonderful force, a life, that plastic art should express, and if this life of the material is not destroyed, but is cultivated and enriched by the artist, it may acquire a wonderful power of expression that will stir the world. A piece of sculpture, therefore, should be created like a crystal—physical laws should govern its fashioning, and the more of art there is discoverable in the work, the less the individuality of the artist becomes apparent." We are not quite sure what that means; but we are told Nadelman is a "Post-Impressionist," and that his "intellectual note and aloofness are intensified by the extraordinarily high polish which he gives to his surfaces, and which he claims enables his works to acquire tone without dirt, after the manner of antique marbles."

Mr. H. C. J. Edwards, borough surveyor of Lambeth, is suffering from overwork, and has been granted three months' leave of absence.

The death is announced, on March 21, at Norwich, of Mr. Walter Augustus Hills, architect and surveyor, sometime Fellow of the Royal Institute of British Architects, formerly of Bow, Middlesex, in his 82nd year.

The *Athenæum*, which has felt the effects of war, and has been appearing less frequently, it is understood, has been bought by Mr. Arnold Rowntree, M.P., and is to see changes. The passing of our foremost literary paper into the hands of the famous "Friends" family is a development which will be watched with interest.

WOMEN AS CONSTRUCTORS.

Almost from the beginning of the war women began to take their share in work of all kinds which necessarily had to be given up in greater and greater numbers by their husbands, brothers, and other relatives, who were called to arms. A good deal of this work was more or less akin to that which has always been regarded as coming within the province of women-labour, but as the months grew into years it became increasingly manifest that the capabilities of women were as expansive as their adaptability was really marvellous. Yet there were some branches in which probably few of us expected to find them rivalling men in every respect. Women architects, even before the war, we knew, but that women bricklayers, carpenters, wood-working machine operators, and, indeed, workers in almost every branch of the building trades, would have attained in a couple of years to a skill unsurpassed by men, unaccompanied by certain drawbacks not unfamiliar to most employers of labour, was a development which few would have predicted.

Any sceptical with regard to the fact that it has been achieved should not fail to visit the exhibition of official photographs, opened under the auspices of the Labour Department of the Ministry of Munitions last Monday at the Royal Colonial Institute, illustrating the various types of work in which women are employed in construction, and the other various industries connected with munitions of war, and which closes on Saturday next. As far as building work goes there is not a trade in connection with which women will not be seen busy, serviceably equipped, and evidently taking the most creditable interest in their work. Several photographs show busy parties excavating; others are of women bricklayers and stone-setters, others mixing concrete; some drilling all parts of steel constructional work, from the smallest gusset plates to rolled steel joists up to 30 ft. in length. Some are operating cranes and hoists; more are hard at it making wooden cases; others are packing steel framework for munition factories, corrugated sheets for trench shelters, and pressed iron flooring for railway bridges. In the saw-mill, the sandpapering shop, at carpentry and joinery, rivetting roof trusses and bridge girders, slotting gas-meters, punching angle frames for munition factories and angles for trench shelters, all are in every respect doing their bit enthusiastically. In the less skilled but more exacting work of the general labourer the women will be seen unloading material from railway trucks and canal barges, scraping, brushing and tarring gas-holders, cleaning locomotives, and busy about a score more similar jobs in which bodily strength is as indispensable as are skill and aptitude elsewhere. As forewomen, time-recorders, in charge of power-houses, and fulfilling other positions of trust and responsibility the women are discharging every function with the calm consciousness of capability unalloyed by the officiousness of the sterner sex newly charged with official superiority.

In the more purely engineering sections the photographs reveal aptitude that is really astonishing. One group is cutting, rounding, trimming, shaping and slotting boiler and condenser tubes; another screwing, facing, and burnishing them. A third is drilling in one operation 3¼-in. diameter holes through the drums of water-tube boilers; more are rivetting steel barrows at the power-rivetting machine. Some are inserting tubes in condensers; others are facing boiler flue-flanges. One might fill a page with the recital of the

titles of the hundreds of photographs exhibited, every one characterised by the evident concentration of effort and attention on the work by the women engaged. Some of the smaller and more intricate work—that in the optical department, for instance, is extremely interesting, and evinces in a remarkable degree powers of precision with which all women are endowed more or less in their own hitherto recognised spheres of work, but which it is marvellous to find transferred in so short a space of time to avocations which demand its exercise in the fullest degree.

One cannot resist the inclination to wonder what is to be the outcome of all this by and by when the war is over. It is, in our opinion extremely unlikely, that, having thus proved their capability, women will consent to be shut out of fields hitherto monopolised by men. For years the medical profession sought to bar the gates to the women doctors, but they came down before the persistent pushfulness of the in every way equally competent lady practitioner. The woman solicitor is with us, and the lady barrister is coming. No ordinary trade union rules are more exclusive than those which guard the portals of physic and law; no opposition by others will keep the women out of any field of industry in which they prove their capability as they have proved it up to the hilt during the war. Their power of organisation is admitted by all, and if denied the right to work side by side with men in any capacity they will enrol themselves under captains of industry of their own sex, and men who decline to accept them as allies will have to look to it when they have to compete with women as rivals. We have no apprehension in regard to the result. In the arts woman has long proved her equality, to say the least. In the crafts she will spur men on to wholesome competition. The admitted surplusage of women will be absorbed in self-reliant work, and their more numerous sisters who still find content in the home will demand and not fail to obtain from their husbands and sons a juster recognition of the capabilities of the sex which has so magnificently risen to its opportunities during this time of national trial in a fashion that may well make Englishmen prouder than ever of Englishwomen.

CINEMA DECORATION.

By R. W. NEWCOMBE.

Cinemas, or picture theatres, to give them the now more generally known name, are buildings which differ in more respects than one from other public places of entertainment architecturally. I am speaking now of the multitudes of halls of various sizes, but of one almost invariable shaped interior—viz., an oblong with a quick slope to the floor and plain flanked walls rising sheer to the roof, usually of considerable height. Such interiors are rarely, if ever, lit up in a manner that could display to any advantage elaborate decorative treatments of the ceilings, but the walls at all times cry aloud for some relief, both in colour and judicious decoration, to break the monotonous effect of their plainness.

There are various means by which this may be successfully attained, but in each case the means must be subordinated to any peculiarities in the dimensions of the interiors themselves as, for instance, a building of considerable width but of no great height demands treatment which will apparently increase its height and bring to all appearances the width into a narrowed compass. It is surprising how much may be effected in this respect by a suitable arrangement of panelling with alternate wide and narrow panels and a scheme of colour so arranged as to bring the walls nearer on either side, the narrow contrasting styles adding considerably to the height in appearance, and for such requirements dark warm tones in the panels invariably yield the best results.

In circumstances such as I have just described it is rarely, if ever, wise to apply a frieze decoration; the panels to be really effective and serve their purpose should be carried to within a few inches of the cornice of the ceiling, and any ornamental treatment should be confined to the panel surface itself, either in the form of a stencilled stripe pattern or diaper all-over, while the styles separating them may be suitably relieved by stencilling a long pendant or drop ornament hanging from a ribbon or patera, ending some third of the way down the styles. This not only affords an opportunity for decorative relief, but at the same time gives the apparent increased height also.

The Empire all-over filling treatment, based on the Griffin, here shown, makes an excellent two-colour stencil for the treatment of panels on the lines suggested, and if the panels be flatted with either Matone 2,200 or 2,227, and the stencil applied in two slightly warmer shades, the effect would be pretty much that of a soft damask, while Matone 2,217 would serve for the styles, on which a soft mossy-green flat ornament stencilled would complete a simple but satisfactory scheme, with the mouldings framing the panels a deep ivory white tone. Obviously, for such a scheme to be really effective, the upholstered seating should be in marked contrast but nevertheless harmonious, and for this purpose either a rich green or electric blue would be most pleasing.

Our second illustration is an emblematical Empire frieze for application where it is desirable to reduce apparently the height of the walls by a light plain treatment of the lower parts and a vigorous decorative effect immediately above the same. There is a large number of buildings where this result is very much to be desired, and the design here reproduced is specially drawn to fit a frieze space of fully 36 inches, being nearly 30 inches over the ornament, and is arranged for easy working in a series of four plates, making the application of the separate colours quite simple and expeditious.

The colour scheme here arranged would be suitable above a plain matoned filling of either 2,225 or 2,216, the ground of the frieze being Matone 2,217 or a little lighter shade. The trophies in the panels are two warm sepia shades, encircled with green wreaths, tied together and supported with blue ribbons; the oval framework, bands and ornamental details of swags and pendants are of a similar sepia or golden brown, but uniformly flatter in treatment, with the same green as the panel wreaths used throughout; the torches separating the panels are of a richer character, being in warm orange and rich sienna-brown tints, with a free use of orange chrome and vermilion in the flames proceeding from them.

Altogether it makes a really effective decoration and is not costly to produce. The ceiling and cornice above should in all instances be quite plain, and cream or ivory white is both safe and suitable. Should the ceiling happen to slope at all, such a frieze should never be carried to meet the angle; nothing is more objectionable to the eye than to look up at what should be obviously vertical details and find the same distinctly leaning.

A very simple expedient will remedy the trouble. Take the ceiling at its lowest point and mark the extreme depth for the ground colour of frieze; then take a line to the other extreme end of the wall and, while it is being held in position, a man may with a long spirit level in the centre have the line adjusted to a true position; the frieze band can then be marked to the proper depth at the high end of the hall and lines struck to the level. The space coming from the higher end to a vanishing point in the ceiling should be finished with the ceiling colour, by which means the objectionable slant would be rendered invisible and the frieze kept in a vertical position. Details of this kind may seem apparently trifling, but it must always be borne in mind that nothing which makes for success can ever be truly regarded as trifling; particularly is this the case in decorative matters.—"Berger's Good Business News."

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FLOOD LIGHTING.*

By L. C. PORTER.

The projection of a flood of light on to a distant object is nothing new. In *Leisure Hour* for 1872, under the head "Public Illuminations," the suggestion is made to illuminate St. Paul's dome by flooding it with light projected from various quarters. Since then individual spectacular installations have been made, as instanced at Niagara Falls, Statue of Liberty, Singer Building Tower, etc.

The general application of flood lighting, however, is of very recent origin. It has been made practical and economical by the perfecting of the concentrated filament incandescent lamp. It is of particular advantage for the illumination of surfaces more or less inaccessible and those that would require expensive runs of wiring for other methods. The original experimental installation was on the water tank of the Driver-Harris Wire Company in Harrison, N.J., from which all other schemes were developed. Since that time it has been adapted for lighting for other than publicity work, construction work, patrols around munition plants, prisons, military camps, bowling alleys, rifle ranges, drill-halls, arsenals, trap shooting fields, logging camps, freight piers, advertising banners, flags, statues, clock towers, fountains, stained glass windows, ice ponds, steam shovel and dredging operations, and many forms of out-door-game fields.

The flood-light unit, essentially a projector, is akin to the "search" light, and their fields overlap.

The adaptation of the focus type filament lamp projector to a searchlight beam (with suitable accessories) makes available many types of "search" lights for small-power boats and signalling lamps and tubes of all types. Many of the United States Coast-guard stations are now equipped with portable battery equipments having a range of fifty miles, as well as range-lights and harbour lights.

The primary function of a flood light is to project illumination to a distance. There are two methods of doing this in common use: One by passing the light generated through a lens and thus concentrating the rays into a beam; the other by reflecting the light rays by use of a reflector of parabolic shape, which accomplishes the same result. With either equipment, if the light could all originate from a point source (a physical impossibility) located at the focal point of a perfect lens or reflector, the resulting beam would be parallel and, neglecting atmospheric absorption, would reach to infinity. However, all light sources have physical dimensions, and hence the beam from such a source used with a projecting lens or reflector will have a certain amount of spread, depending on the size of the light source, the focal length of the projector, etc. Its intensity is assumed to vary inversely as the square of the distance from the projector.

The size of the light source, however, has a very material effect upon the spread of the beam, and, therefore, also upon its intensity. For, assuming that we have the same volume of light to work with, it is obvious that if it is spread out over a large area, as with a beam of large dispersion, the light intensity on this area must be lower than if all of the light were confined to a small area by projecting it as a narrow beam. Thus the source of light has great influence on the resultant beam. Having a certain light source to work with, the resultant beam when this source is used in a projector, will also depend somewhat upon the size and design of the lens or reflector used, and also on the accuracy with which the light source is located at the exact focal point. In general it might be said that a glass lens or glass mirror can be ground and polished more accurately than a metal mirror can be spun; hence, where extremely powerful beams are required, such as in navy searchlights, or where a little "spill" or stray light is objectionable, such as in stereopticon work, the glass lens or mirror is usually used. For flood-light service, however, neither extremely powerful beams nor ones with no stray light are desirable. For this reason metal reflectors are most common in this service.

Metal reflectors may be made of polished aluminium, having a reflection coefficient of about 61 per cent.; or of brass, nickel-plated, with a reflection coefficient of about 54 per cent.; or of brass- silver-plated, producing a surface with 86 per cent. reflection. The aluminium reflectors have the advantage that they can be buffed up an indefinite number of times, whereas the plating on the others gradually wears off with frequent polishing. Replating, however, is not a very serious problem, and many silver-plated reflectors are in service. The reason for the nickel surface is that it does not corrode or tarnish quite so rapidly as silver.

Flood light reflectors are parabolic in shape, but vary as to depth and focal length. With a given diameter a short focus parabola will utilise more of the total light flux from a source than a long focus parabola. Where incandescent lamps are used as a light source care must be taken not to use so short a focus reflector that the lamp bulb will strike the reflector and prevent the filament coming into the focus. As focus-type incandescent lamps are generally made in round bulbs with the filament in the centre of the bulb, we can state that the focal length of the reflector should not be less than half the diameter of the lamp bulb, plus a small clearance space of, say, ¼ inch.

The importance of careful focussing may be shown by the following data on a 16-in. diam. 3-in. focus reflector.

Location of Filament.	Beam Candle Power.
At focus	220,000
1/16 in. back of focus	70,000
2/16 in. back of focus	40,000
3/16 in. back of focus	18,000
4/16 in. back of focus	8,000

Moving the filament ¼ in. to the side threw the centre of the beam 4 ft. to one side and reduced its c.p. from 220,000 to 125,000.

The dimensions of the light source also have an important influence on the beam c.p. Using six 100-watt lamps of different types, the beam c.p. of one projector varied from 462.000 to 3,800.

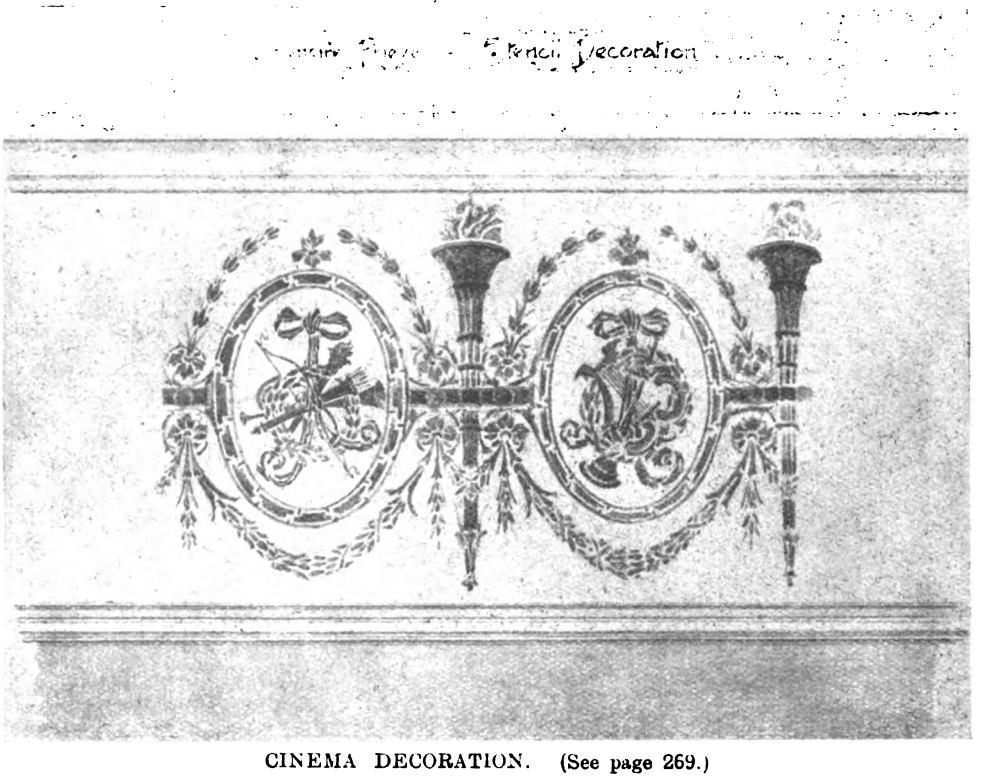
Most projection devices are equipped with means of moving the source so that it may be correctly focussed. Improperly adjusted automobile headlights are to-day one of the greatest causes of complaint in regard to glare.

One of the special advantages of flood lighting is its simplicity. The whole equipment is so simple that no expert is needed to install it.

The question of location of projectors is largely one of judgment. A few minutes' experimenting will quickly demonstrate the most satisfactory location. In flood lighting, it is well to choose at least two locations—one diagonally off from each end of a surface to be lighted. Thus, the light falling on the surface from two different angles will tend to minimise shadows which might be thrown by protrusions, such as window-ledges, cornices, pillars, etc., which would occur if the light all came from one location. Where possible, it is well to avoid projecting the light directly—i.e., perpendicularly at a surface—as it tends to produce spots of light rather than even illumination.

Having the light come at angles from two or more locations also tends toward more even illumination. It is well, where prac-

* Abstract of a paper read before the Engineers' Club of Philadelphia, Feb. 16.



CINEMA DECORATION. (See page 269.)

tical, to arrange units, so that no one part of the surface illuminated is entirely dependent on one projector. It is quite common practice in lighting a surface to cross the beam—*i.e.*, have the projectors at one location light the portion of the surface farthest from them—and similarly at other locations.

In lighting a building facing on a street care should be taken to mount the projectors high enough, or so train their beams as to prevent them from shining on the eyes of pedestrians, drivers, etc., as glare might result in serious accident. For this reason buildings are frequently not flooded below a point 15 feet above the street level. It is well, where possible, to locate the projectors in such positions that they will not be visible from the street.

The question of intensity necessary and wattage is one which depends largely upon local conditions. If the surface to be lighted is very light colour and seen against a dark background, it may be practical to use as low as ¼-watt per square foot of surface lighted. Light grey buildings, such as granite and marble, may be well lighted in average city surroundings with an energy expenditure of one watt per square foot of surface lighted. The darkest surfaces, such as red brick and light sandstone, do not appear so well flood-lighted. Red brick requires at least 2 watts per square foot, while dark red, dark green and bronze surfaces may require as high as 5 watts per square foot. Expressed as surface intensity, the average requirements are 2 to 10 foot candles, depending upon local conditions.

Given a surface to flood-light, the procedure is, first, to find the available locations for flood-lighting projectors and the distances and angles from the area to be lighted. Next, determine the area to be lighted and estimate (as above) the total wattage necessary. This, divided by the wattage of the lamp to be used, will give the number of projectors required. If this figure is fractional (one-half or over), always use an extra projector. The beam from a projector striking squarely on the surface at right angles to the axis of the beam illuminates a circle; while striking at an angle, the area lighted is an ellipse, whose length and width depend upon the distance to the projector and the angle between the surface and the axis of the beam.

The exact direction in which to train each projector and the spread of the beam can be worked out on paper for any flood-lighting installation. This, however, is generally unnecessary. With the projectors in place, it is a very easy matter to so train them and arrange the spread of the beams (by means of the focussing device on the projector) as to cover the area to be lighted to best advantage.

Flood lighting projectors are available giving almost any desired spread of beam, and for those who wish to work out flood-lighting problems in greater detail, the manufacturers of such equipment can furnish distribution curves of their equipment. In lieu of such curves, the projectors can be easily tested and curves made locally.

The popularity of flood lighting has brought about the development of quite a number of different makes of projectors, and this number is being steadily increased. The installation on the Philadelphia City Hall tower is of interest. Three hundred and four flood-lighting projectors are used for this, each containing a 500-watt flood-lighting lamp. As part of this tower is covered with bronze having a very low coefficient of reflection, it presented a very difficult lighting problem. Five times the intensity of light used on the grey granite part of the tower is thrown on the bronze. The disposition of the beams from the projectors, which are mounted in groups on the roof of the City Hall, is as follows:—

Forty are trained on the stone part of the tower, 80 on the clock part, 144 on the dome, and 40 on the statue and pedestal.

Among other notable installations are the Statue of Liberty in New York Harbour, the Soldiers' and Sailors' Monument in New York City, a Civic Celebration in New Haven, and a pageant in Newark, N.J.

CAUSES OF EFFLORESCENCE ON BRICKWORK AND MASONRY.

By W. C. DUMAS.

It is not uncommon to see an otherwise excellent piece of brickwork or masonry marred by a scum of white efflorescence on the surface. Sometimes these deposits appear in the mortar joints. This is not only unsightly, but in some cases may positively endanger the strength of the work. The cause of these deposits is now fairly well understood, and several methods have been proposed for preventing their formation. The remedy must, however, be applied during the course of manufacture of the brickwork, or at the time of the mixing of the mortar.

The amounts of the salts which compose these scums vary between 0.001 per cent. and 0.50 per cent. As little as one-thousandth of 1 per cent. can be seen on the surface of a brick. The maximum is about one-half of 1 per cent.

In most cases these efflorescences are sulphates, but they may be almost any other soluble salt. Lime is the chief offender, and in the majority of cases the greater part of these deposits consists of sulphate of lime. Analysis shows these residues to contain in addition to sulphate of lime, magnesium sulphate, potassium sulphate, sodium sulphate, and aluminium sulphate in lesser proportions.

Why do these salts form in certain cases and in other cases they do not? In the manufacture of brick, the principal materials used are water, clay and coal. All of these materials may contain impurities, which contribute to scum formation. The coal may contain a high percentage of sulphur, which during the burning process unites with the insoluble materials of the clay to form soluble salts to a greater or less extent. Afterwards, especially if the bricks are used where they are exposed continually to moisture, the soluble salts are gradually brought to the surface by the capillary action of the moisture in the interstices and pores of the brick and then deposited on the surface as a scum.

The clays used in the manufacture of brick may contain soluble salts caused in them by weathering. This is often the case, especially if the material has been obtained near the surface where decomposition takes place faster. In the cast of clays of this kind, future trouble can be avoided by first leaching out the soluble salts. A more expensive process is to add barium salts to the wet clay before moulding.

Some waters used in the manufacture of brick and earthenwares of all kinds carry much dissolved matter which is incorporated with the clay in the mixing. When the raw bricks are dried and burned and the water is evaporated, the chemicals contained in the water are left behind and may prove a troublesome source of scum formation. Such water should be treated before they are used to remove the objectionable salts.

The drying and burning processes have much to do with the tendency of the product to form scums.

First, the drying must be steady and rapid, and condensation of moisture during this stage must not take place. Afterwards, thorough burning must be had in order to give a hard, compact brick as well as to cause a partial combination of the soluble salts with the silica of the clay.

The causes and prevention of efflorescence in mortars are the same as those for brick. It is very essential to prevent the formation of scums in mortars because these deposits weaken the material in the mortar joints.

Many patents have been taken out for the prevention of efflorescence on bricks. Some of these patents call for the coating of the outer surface of the wall with some material impervious to water after the bricks are in place. Others of these patents provide various substances which are incorporated in the clays before they are burned. But the surest way to produce a sound product is to control the purity of all materials entering into its manufacture.

Occasionally the cause of the trouble is outside the brick itself. There is a case on record where a certain kind of sandlime bricks showed a marked efflorescence. Upon examination, it was found that the materials used in the manufacture were free from soluble salts. Finally, the trouble was traced to the storage yards where cinders and ashes had been dumped. The sulphates and other soluble salts from them had been absorbed by the raw brick and were the cause of the trouble.

Efflorescent deposits can be removed from walls without much trouble. If the greater part of the scum is calcium sulphate, a dilute solution of hydrochloric acid, consisting of one part of strong acid to five parts of water, will do the work. In certain other cases the wall is first washed with a solution of hard soap, consisting of two pounds of soap to the gallon. After this, it is washed with an alum solution containing one pound to the gallon.—*The Decorator.*

SOME ELEMENTS OF THE SCIENCE OF BUILDING.

At the March General Meeting of the Hampstead Scientific Society, a lecture on "Some Elements of the Science of Building" was given by Mr. W. E. Vernon Crompton, F.R.I.B.A.

The lecturer selected from his large subject the methods of making economical and sound coverings to buildings, and illustrated his remarks with beautiful photographs of the roofs and domes of well-known Greek, Roman, Byzantine, Mediæval, and Renaissance temples and churches. A building may be covered in two ways, by a trabeated or beam construction, the method adopted by the Greeks, or by an arch, vault, or dome.

The mechanical problem involved in the first method was explained by Mr. Crompton by means of diagrams and a model. He showed how the stresses were distributed in a beam, and how they could be provided for, leading to the theory of the modern lattice girder. He also showed the necessity for knowing the strength to resist of the materials used. With photographs on the screen of many mediæval church roofs, the function of each member was explained, whether to resist thrust or as a tie-rod to resist tension. The use of the hammer-beam for shortening the span was illustrated by the roof of Westminster Hall. The roof truss with its many varieties, with king post, queen post, etc., was explained and illustrated.

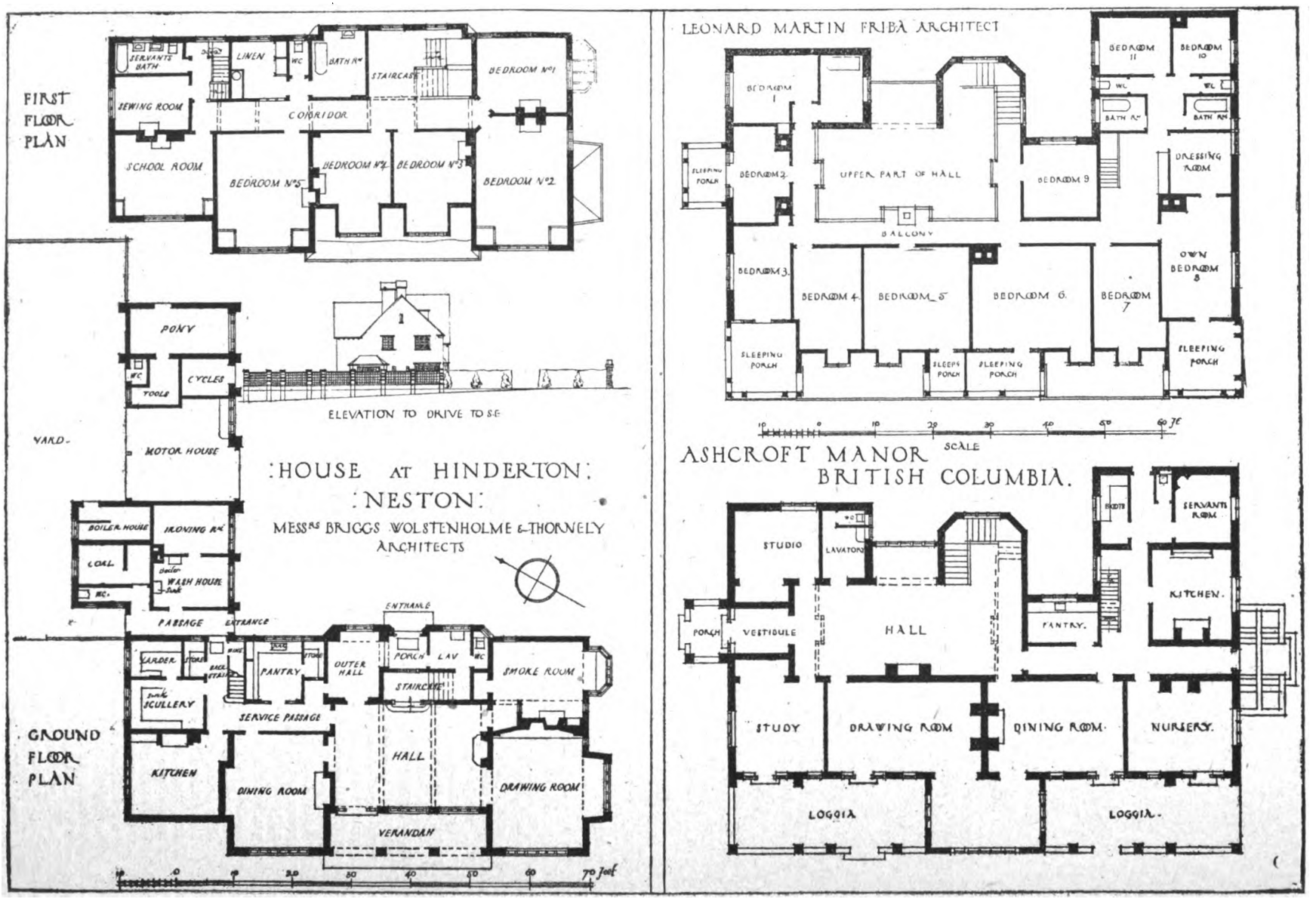
The lecturer then dealt with the Mansard roof, first developed by François Mansard, and exemplified in the Palace of the Luxembourg and many other well-known buildings in Paris. Here the roof has two or more portions of different angles of slope, taking the form, but inverted, of the long straight links of a chain hanging freely from its ends. This kind of roof is to be seen in many modern buildings in London.

The principles of the arch and vault were next discussed. The method adopted by the Byzantines in covering a great area with a dome was illustrated by the Church of St. Sophia, and the further development of this method, where the dome rests on a drum, was shown in the old cathedrals and other churches.

The method adopted by Wren at St. Paul's was to support the lantern on a cone with an inner and outer dome built on light scaffolding within and without this cone. Interesting details of the way the weight was distributed and the stresses resisted in St. Paul's dome were explained.

The lecturer finally dealt with Gothic vaulting and with the flying buttress, illustrating his points with photographs of charming details of British and French cathedrals. The pointed arch, he considered, had originated as a solution of the geometrical problem of vaulting a space of differing span in two directions. The function of the flying buttress was to resist the outward thrust of the roof. This resistance was increased by the weight of the pinnacles arising from the buttress. These were not placed there merely as ornaments.

Mr. J. S. Hurst, C.E., formerly assistant surveyor of Bridlington and now surveyor of Southwold, has been gazetted second-lieutenant of the Devonshire Regiment. He is the son of Mrs. Hurst, Scalby Road, Scarborough.



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THE ENTRANCE FRONT.

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Stewart Bale, Photo.]

THE ENTRANCE HALL.

HOUSE AT HINDERTON NESTON, CHESHIRE.—Messrs. Briggs, Wolstenholme and Thornely, FF.R.I.B.A., Architects.

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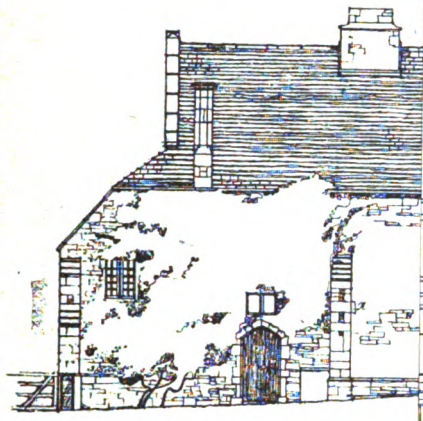
ABBOTS HOUSE MU
SOMERSET



MUCHELNEY ABBEY FOUNDED IN THE 10TH CENTURY HAS BEE
DESTROYED: THE ABBOTS HOUSE HOWEVER CURIOUSLY
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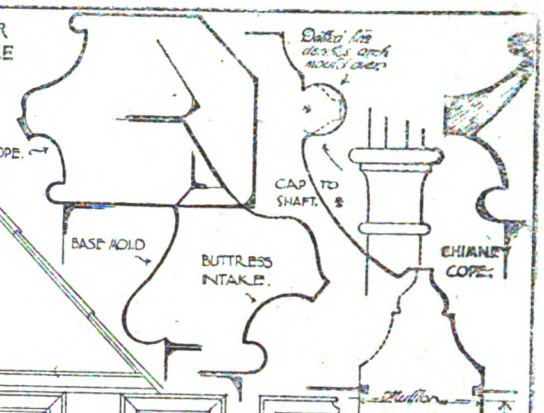
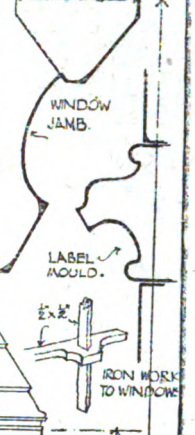
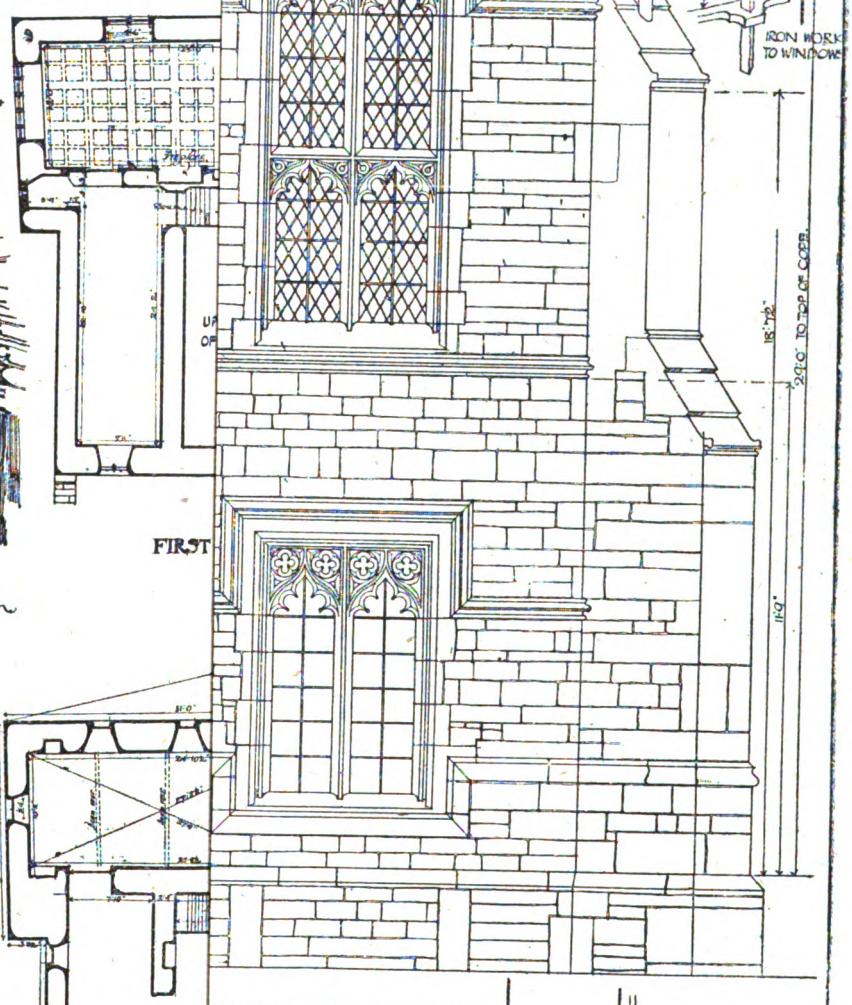
BEING OF BLUE PUBSBURY STONE.

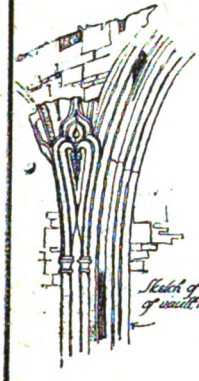
QUARTER FULL SIZE DETAILS



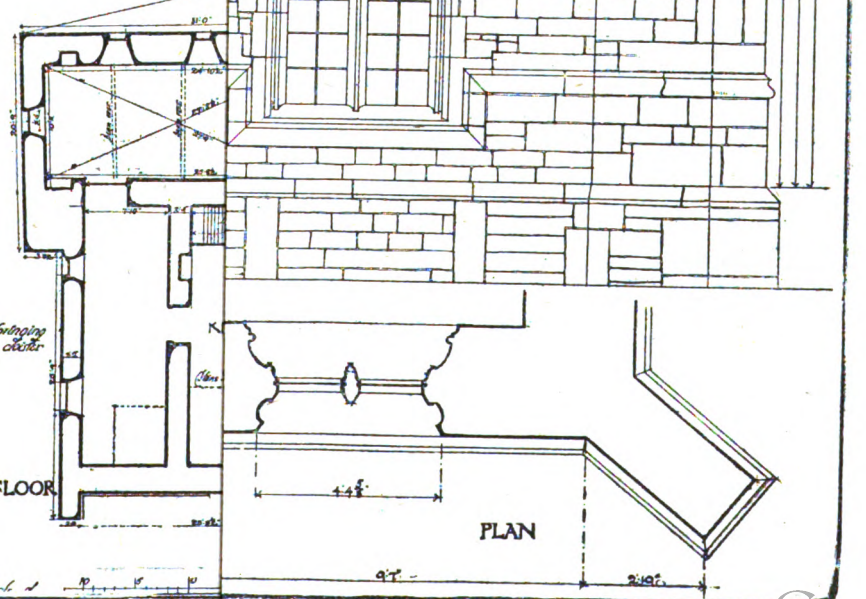




Sketch of door from cloister to Anti Room



Sketch of fanning of vault in cloister



MUCH[illegible] MacGregor, Architect.

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Our Illustrations.

HOUSE AT HINDERTON, NESTON, CHESHIRE.

The site for this house has a slight fall to the south-west, and is about two or three acres in extent. A feature has been made of the spacious hall, which is so arranged as to make a comfortable sitting-room. Service to the front door and to the dining-room is planned to avoid passing through the hall. The ground floor rooms are 8 ft. 6 ins. in height. The hall floor and the staircase are of oak, and the walls are panelled in oak. The joiners' work elsewhere is of American white wood, stained and dull polished. The rooms throughout are heated by means of hot-water pipes and radiators. The walls externally are faced with 2¼-in. rustic Sutton Oak bricks, which are light red, varying to dark purple in colour. The roofs are covered with small stone slates supplied and laid by Messrs. Adlard. Messrs. J. and F. Kitchen were the general contractors.

The gardens were laid out by Messrs. Backhouse and Sons, of York, from plans and under the supervision of the architects, Messrs. Briggs, Wolstenholme, and Thornely, FF.R.I.B.A., of Liverpool. We give an exterior view and interior with a copy of the two principal plans. At an early date a photograph of the garden front will follow.

THE ABBOT'S HOUSE, MUCHELNEY ABBEY, NEAR CREWKERNE, SOMERSETSHIRE.

The almost perfect condition of the abbot's house at Muchelney adds greatly to its value and interest. The buildings have frequently been more or less fully described, but very seldom illustrated in a manner worthy of the subject. The remains of the Abbey of SS. Peter and Paul are considerable: the only part, however, actually intact is the house erected for the abbot. We are enabled to-day to give a capital double-page of measured drawings, including the south elevation to a larger scale. This structure is a remarkably good example of English domestic work erected towards the end of the fifteenth century. Part of this sheet of illustrations is devoted to a block plan showing the mediæval lay-out of the Abbey and also its position in reference to the village of Muchelney. We are indebted to Mr. James Macgregor, of Dunfermline, for the loan of these excellent and reliable drawings. His marginal notes attached to the sketches furnish several items of useful information. The foundation of the Abbey is obscured by much romance, and the credit is accorded indiscriminately to Alfred, Ina, and Athelstane. On the authority, however, of Matthew of Westminster the date of its dedication was January 7, 939 A.D. None of these tenth century buildings now exist, and in the course of time they had to make way for later ones. The ruins to-day chiefly belong to the fourteenth and fifteenth centuries. Few abbey buildings had a more chequered existence than those at Muchelney, and the last abbot was Thomas Yve. The establishment was first disseised or dispossessed, so that the brethren fell into debt, and this induced quarrels, which continued till the contending parties were bodily expelled, and this happened during the first half of the sixteenth century. The whole of the Abbey property was granted by Henry VIII. to Edward, Earl of Hertford, better known as the Duke of Somerset. This gift took place in 1539. It is remarkable to what extent the domestic buildings at Muchelney escaped injury during the demolition which ensued, and these remains are most distinctive. The beautiful cloisters suffice to establish their reputation for fine architectural merit. Pisbury quarries supplied the blue rubble masonry of the wallings, and the doorways, window dressings and bands are of Ham Hill stone. The hall was used for a long while as a barn, though otherwise the place, generally speaking, has been well looked after, particularly in more modern times. The abbot's chamber has a handsome stone chimney-piece, with a rich fascia filled with quartrefoil tracery cuspings besides a foliated flat cornice in two strings, one above the other, both terminating right and left on to a twisted spiral shaft set at the angle and carried right up the face of the chimney breast; then capped by freely designed scroll carvings very late in the Gothic style, but crisp and refined in detail. Richly panelled backs to the wall seats extend along the wainscot under the mullioned and cusped stone windows ranging along the left of this apartment looking towards the fireplace. These pretty lights have unequal divisions with moulded transomes and old quarry glazings. The church at Muchelney has a splendid Henry VII.th tower, but perhaps the belfry is not so imposing as that of the neighbouring parish of Kingsbury. This latter tower is in some respects even finer than the marvellously rich Perpendicular steeple at Huish Episcopi in the same vicinity. The font at Muchelney has an oversailing bowl carved with a crucifix and set out with uncommon pendant shafts projecting at the corners. Parts of the building belong to the thirteenth century. The vicarage at some time or other was contrived out of the ancient Abbey buildings.

ASHCROFT MANOR, BRITISH COLUMBIA.

The geometrical illustrations given herewith from the office drawings are self-explanatory. The central hall running up, as shown by the section, with a balcony extending along three sides, makes a commodious and airy feature, and the open verandahs on the south front of the building add to the amenities of the reception-rooms, which are also thereby protected from the extremes of temperature. Mr. Leonard Martin, F.R.I.B.A., is the architect.

ELECTRIC LAMP GLASS REGULATIONS.

The Minister of Munitions orders that all persons shall comply with the following Regulations :—

MANUFACTURE.

(1) No person shall manufacture any electric lamp glass unless the purpose for which such glass is required has been approved. Such approval must be evidenced by one or other of the following, which must be quoted by the ordering firm to the manufacturer, together with the purpose for which the glass is required :—

(a) Reference to and number of an Admiralty, War Office or Ministry of Munitions contract for which the glass is necessary; or

(b) A certificate authorising the supply issued on behalf of the Minister of Munitions by the Director of Optical Munitions and Glassware Supply.

(2) Manufacturers of Electric Lamp Glass are required to render to the Director of Optical Munitions and Glassware Supply at regular intervals full and accurate returns of their manufacture and output of electric lamp glass in accordance with the directions from time to time given by the said Director.

PURCHASE AND SALE OUTSIDE THE UNITED KINGDOM.

(3) No person shall buy, sell or deal in any electric lamp glass situated or to be manufactured outside the United Kingdom unless a certificate authorising such purchase, sale or dealing has been issued on behalf of the Minister of Munitions by the Director of Optical Munitions and Glassware Supply.

DEFINITION CLAUSE.

(4) For the purpose of this Order Electric Lamp Glass shall include all glass intended for use in the manufacture of electric lamps except glass used or intended for use in lamp caps for insulating purposes, but shall not include glass shades and similar accessories.

(5) All applications in reference to the above Order should be made to the Director of Optical Munitions and Glassware Supply, Ministry of Munitions of War, 117, Piccadilly, W.1.

A memorial tablet is to be placed in the council chamber, Town Hall, Ventnor, in memory of the late Town Clerk, who, having survived the privations of Kut during the whole of the siege, died as a prisoner of war in the hands of the Turks shortly after the surrender of that place.

STONE AND CONCRETE FOUNDATIONS FROM THE STANDPOINT OF EFFICIENCY AND ECONOMY.*

By G. C. WARREN.

"Economy and efficiency" have come to be commonly used together as a high-sounding expression of which one almost stands in awe. To my mind, with all its grandeur, "economy and efficiency," in its most extreme application, is well embraced in the one little word "best," when that word is used in its broadest sense of "all things considered."

An engineer who would say that any one type of road or pavement foundation or surface is "best" or "most efficient and economical" under all conditions would be like an architect who claimed that either stone, brick, concrete, or lumber is the best building material for all conditions.

In my judgment, the question of "best" or more "economical and efficient" pavement foundation (as to both character and depth) to meet any particular case, necessarily entails a careful study and consideration of the conditions applying to that case, including the character of subsoil, character of traffic, character of wearing surface to be laid on the foundation, and climatic conditions.

As a general statement applying to new pavements, I think a statement on this subject, made by the company with which I am associated, in its instructions issued fifteen years ago, and maintained at all times since then, covers the ground as well as it could be covered in a few words. This is as follows :—

An unyielding foundation is essential. Our specifications for bituminous base are designed for characters of subsoil which can be rolled to provide a firm sub-foundation. Where unyielding subsoil conditions do not exist, or where the roadway is so narrow or contains such obstructions as to make proper rolling of foundation impossible, the use of hydraulic concrete is recommended, being very careful that the concrete is roughened as specified. It frequently occurs, and cannot always be foreseen, that different portions of the same street, with a view to economy and utility, require different thicknesses as well as characters of foundation; for this reason it is advisable that specifications should provide for payment for the foundation per cubic yard, and prices for both bituminous and hydraulic concrete foundation.

In the fifteen years which have elapsed since the formulation of this rule I have seen nothing to indicate that, as between crushed stone and hydraulic cement concrete foundation it is not absolutely correct, except as noted below in the case of sandy subsoil under certain conditions. I, however, freely confess that I have seen many cases of mismanagement and the use of crushed stone foundation under subsoil and other local conditions where such a foundation should not have been specified, and also the adoption of expensive concrete foundation under subsoil and other conditions which make such adoption a lack of true economy to an extent that, to my mind, constitutes incompetence.

In discussion of this matter "concrete" is considered as including any dense aggregate ranging from coarse to fine, the particulars of which are bound together by any cementing agent, whether hydraulic cement, bituminous cement, or other cement.

BLOCK PAVEMENTS.

I will assume it to be a pretty generally recognised fact that all forms of block pavement must be laid on concrete base, for the reason that broken stone base does not provide a bed on which the blocks can rest without danger of rocking under traffic. Incidentally, it will also be generally conceded that, unless the blocks are more completely and firmly grouted than is practicable on the entire area of pavement, it is necessary that the depth of concrete foundation shall be greater than the foundation for a monolithic wearing surface. The reason for this is that in the case of the block pavement the weight transmitted to the foundation is that of the load resting on individual block

* Before the American Society for the Advancement of Science.

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areas, while in the case of monolithic surfaces the weight of the same load transmitted to the foundation is distributed over many times greater area. The use of a broken stone foundation is, therefore, practically limited to monolithic bituminous wearing surfaces.

BROKEN STONE FOUNDATIONS.

Each individual case should be given special consideration, with special reference to the character of subsoil and climatic conditions. If the subsoil is of the nature of clay and the climate such that the sub-base is liable to become wet before the waterproof pavement surface is laid, then it is unsafe to specify broken stone base, because in such wet yielding condition the subsoil does not provide a sub-grade over which either the crushed stone or bituminous surface can be properly compressed. If, on the other hand, the subsoil is of a gravelly nature, or if in a climate where it seldom or never rains during the working season, no more serviceable or inexpensive foundation can be produced for a stable bituminous wearing surface than a thoroughly rolled crushed stone.

This has been abundantly proven in many cases, of which I will cite two.

SANDY SUBSOIL.

Nearly sixteen years ago we had great difficulty in securing a solidly compacted broken-stone foundation on the sandy soil of one of the lake cities of Indiana. The spreading of marsh grass over the sandy sub-grade before spreading the crushed stone helped immensely. During the present year, however, we met an interesting case in connection with the building of a bitulithic pavement on the bridge approaches of the "Interstate Bridge" crossing the Columbia River from near Portland, Ore., to Vancouver, Wash. The bridge floor is 21,624 square yards, and the bitulithic pavement was laid on heavily-reinforced Portland cement concrete foundation. The bridge approaches are about three miles in length, and are formed of sand pumped from the Columbia River, the newly-made fill thus made having depths varying from 5 ft. to 25 ft. Being washed in place, the sand fill is compressed as solidly as possible. The specifications required a broken stone base, laid on this sand fill. The general belief is that, under such conditions, the crushed stone, in rolling, will compress several inches into the dry sand, and even then not be solidly compacted. It has, however, been proved that a generous amount of water used to wet the sand during the process of spreading and rolling the base, provides a sub-grade so solid that the stone compresses into it but very slightly, and becomes solidly compacted under the twelve-ton steam roller, and, using the same heavy roller, no trouble develops in compression of the bitulithic wearing surface.

Economic utility of broken stone foundations is especially applicable in the case of old macadam country roads or city streets, the grade and contour of which are such that they can be regulated without serious disturbance of the old macadam.

It is a well-established fact that with a dense, stable, waterproof pavement surface, rolled crushed stone base practically overcomes the cracking of Portland cement concrete. It is also self-evident that a crushed stone foundation has the important economic advantage that in the case of a broken stone base the bituminous wearing surface, under pressure of the roller, fills the chinks in the surface of the foundation and forms an important union between the foundation and surface which is impracticable in the long run with either Portland cement concrete or silicate of soda concrete foundations.

Concrete foundations are divided into three general classes—Portland cement concrete, bituminous cement concrete, concrete bound together by other classes of cement.

As previously stated, in cases of weak subbase, solid, dense concrete has an important advantage, in that by bridging over the weak sub-base it imparts a greater strength than is possible with rolled crushed stone under such circumstances. Taking the subsoil conditions throughout the United States and Canada as a whole, in a large proportion of cases, doubtless, the subsoil and climatic conditions are such as to make the use of "concrete" desirable but, as noted above, this is not at all a universal rule.

Well-made Portland cement concrete base of the conventional proportions of one part cement, three parts fine aggregate, and six parts coarse aggregate, has a greater crushing and tensile strength than either broken stone or other types of concrete, but it is well established that a slab of Portland cement concrete laid on more or less damp subsoil will necessarily crack, and, where cracks occur in the foundation, then cracking of the pavement wearing surface is sure to follow. In many cases such cracking is the lesser of two evils, and in such cases there can be no doubt but that Portland cement concrete is the best, and, therefore, the most economical and efficient pavement foundation, but this condition is not at all universal nor even nearly so.

Bituminous concrete—i.e., concrete in which the well-proportioned, coarse, and fine aggregate, which may be either natural gravel and sand, or crushed stone and sand, are heated and mechanically mixed with suitable bituminous cement and spread and rolled on the previously compacted sub-grade—has the extremely important advantage of absolutely overcoming the cracking of Portland cement concrete foundations. It also has the least equally if not more important, advantage of a thoroughly united and unified foundation and surface, the two courses being of the same class of materials.

During the past year the laboratory of the company with which I am associated has done a great deal of work investigating the use of silicate of soda as the cementing material for concrete foundations and finds that, in connection with a substantial waterproof bituminous wearing surface, which is also necessary to secure highest efficiency with Portland cement concrete, it is quite practicable to make high grade a fundation in this way. The question is one of relative prices of Portland cement and silicate of soda, and consequent first cost of construction. We have also successfully laid a wearing surface over concrete made of silicate of soda and crushed stone, in Sudbury, Ont. The silicate of soda concrete has greater resiliency and less rigidity than Portland cement concrete, and apparently materially lessens, if it does not entirely overcome, the cracking of Portland cement concrete foundation.

OBITUARY.

We regret to record the death of Captain Harold Mason Gleave, the only son of Mr. William R. Gleave, A.R.I.B.A., of 8, St. Peter's Church Walk, Nottingham. Captain Gleave volunteered for service and was commissioned as Second Lieutenant 3rd Sherwood Foresters, August, 1914. He was attached to the 2nd Sherwood Foresters in France in January, 1915; was wounded in the Battle of Hooge in August, 1915; gazetted Lieutenant, May, 1915, and Captain, January, 1916; attached to the 1st Sherwood Foresters in France in July, 1916. Struck by shell whilst returning from action on March 6, 1917, he was instantly killed, and was buried at Andover, near Amiens. He was only twenty-two years of age, and will be missed by many friends.

The death is announced of Mr. George Malam Wilson, architect, Sheffield.

Liverpool is to have a "War Museum." On that the Museums Sub-Committee are unanimous. The collection of relics will be commenced at once, and it is confidently anticipated that funds for the erection of an annexe to the Central Museum—a second Hornby room, in fact—can be counted upon when builders resume operations.

The late Mr. F. J. Mankiewicz has bequeathed to the London Museum his entire collection of prints and drawings relating to London. This collection includes all the most famous topographical views, and many of them of rarity. On the re-opening of the London Museum a gallery will be set apart for the display of the whole collection.

REINFORCED CONCRETE UNDER FIRE.

The following valuable report on the recent great fire at the Quaker Oats Building, Ontario, Canada, at which, according to the Canadian *Contract Record*, "the most intense and longest sustained heat on record" was experienced, and "concrete was completely dehydrated," seems deserving of the careful consideration of all engaged in the design and erection of similar structures. We regret space is inadequate for the reproduction of the illustrations referred to. They will be found in the issue of our contemporary of February 21 last by any further interested :—

Editor, Contract Record :—

Dear Sir,—In compliance with your request I beg to hand you herewith a report on the recent fire at the Quaker Oats Building in Peterborough, Ontario, also copies of photographs which, I believe, in conjunction with the report, will explain the fire very well.

In my opinion it would be impossible at the present time to erect any building that could resist a fire of the magnitude and duration to which this building was subjected. The building was apparently constructed in what is known as the four-way reinforced concrete type of construction. It will be noted that on the first floors there were no drop panels at the columns, and also that there was more steel put in the diagonal strip than was put in the straight or direct strip. This is not in accordance with the more recent by-laws, which usually put more steel in the direct and less in the diagonal. Judging from the report, however, the building apparently stood up under quite severe loading and due to the fact that the different by-laws covering this type of construction vary as much as 100 per cent., it seems out of order at the present time to pass any criticism on the way this building was designed.

Yours truly,
W. W. PEARSE,
City Architect and Supt. of Building.

Toronto, February 12, 1917.

W. W. Pearse, Esq.,
City Architect and Supt. of Building,
City Hall, Toronto, Ontario.

Dear Sir,—I beg herewith to present a report* of my recent trip to Peterborough, Ontario, to study the effects of the fire at the plant of the Quaker Oats Company. In addition to the written report there are three plates, one table, and fifty-two photographs.

THE REINFORCED CONCRETE WAREHOUSE.

The reinforced concrete warehouse was approximately 60 feet wide, 280 feet long, and basement and six stories high. The first four stories were built in 1910, and the two upper ones in 1916, and the common practice at these different dates is well represented in the details of construction. The floors were designed for 200 lb. per square foot, live load. In the first four stories there are no drop panels at the top of the columns, and the column caps decrease in diameter with the columns. There is also more steel in the diagonal bands of reinforcement than in the direct bands. The circular reinforcement of the column shafts consists of separate steel hoops, about 1½ in. by ¼ in. in section, spaced about 8-in. centres. As the theory of flat slab construction was not understood at the time these stories were built, these are features that contradict the facts brought out later by extensometer tests, but they represent the best construction known at the time. The upper two floors show the column capital of constant diameter, the drop panel, the correct distribution of the slab steel, and the spiral form of circular column reinforcement. For some reason or other, the drop panels were omitted from around the caps of the wall columns in the two upper stories and a bracket substituted. On the corner columns even these brackets are lacking. Since a drop panel would not have interfered with the windows, it is hard to tell just why this was done, for at these places the bending moments are most severe. It might have been that the type of construction adopted required less work on the forms. It might be

* Presented herewith in abstract only.

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fair to state, however. that up until quite recently another American firm had this bracket system as one of its standards, in which case they used four brackets around the interior columns, and no flaring heads. When the two upper stories were erected it was decided to increase the diameter of the columns on the third and fourth stories to aid them in carrying the additional load. This was accomplished by wrapping them in expanded metal and pouring a rich grout around them. The fifth floor—the former roof—was increased from 7 ins. to 9 ins. in thickness by laying expanded metal upon it and pouring another 2 ins. of concrete on it. The aggregate used throughout was a local gravel of good quality. The north wall of the building was blank. The east wall, facing the lane between the reinforced concrete building and warehouse No. 1 had a large number of windows with metal sash and wired glass. The sash and frames in the first four storeys were of hollow metal, and in the upper two storeys were of solid metal. On the other two sides of the building ordinary wooden frames and sashes were used, with the exception of the north bay on the west side, which was the same as on the east side. All the buildings, with the exception of the circular grain bins, are now in ruins. The lower 15 ft. of two of the tanks were somewhat spalled, and on the easterly of these two tanks one small hole was burned through the wall. As this was below the level of the floor in the bin it did no damage.

The fire was started about 10.15 a.m., by an explosion in the dry house. The exact cause of the explosion has not yet been determined, but is under investigation.

So intense was the fire that not even one charred stick of wood may be found on the plant.

TEMPERATURES DEVELOPED IN THE FIRE.

Eloquent testimony as to the temperature developed in the reinforced concrete building is given by the expansion cracks. Owing to the heating of the floors and their consequent expansion, the length of the building considerably increased, and caused peculiar diagonal cracks to appear in the brickwork. At the other end of the building the cracks run diagonally downward in the opposite direction. One curious effect of expansion due to heat was found in the elevator penthouse. The upper end of the elevator guides came to within an inch of the ceiling formed by the penthouse floor slab. Due to expansion, these guides pushed two holes through this slab.

The temperature in the interior of the building places must have been very intense, for melted metal parts of machines may be found here and there in the ruins. In the front windows of the second storey and in the front and some of the west windows on the third storey of the concrete warehouse were found melted sash weights. In some cases they were but slightly fused, in other cases two or more weights had run together, and in several places on the third floor the weights were reduced to shapeless masses of cast iron. On the inside of the walls of all the buildings may be found large patches of fused brickwork. The melted brick ran down the face of the wall and out upon the floor like molasses, for a distance of about 18 inches, and over the doorway it trickled across the face of the concrete lintel and dripped from there to the floor. Upon breaking off some of this fused brick from the lintel, it was found that the concrete had been badly calcined beneath the running brickwork. From the fact that cast iron melts at about 2,200 degs F. and that brickwork reaches the stage of incipient fusion at about the same temperature, it must be concluded that at many places during the conflagration, temperatures in the neighbourhood of 2,300 degs. F. must have been reached.

EFFECTS OF THE FIRE ON THE CONCRETE BUILDING.

That the concrete building became such a wreck is something that may cast grave doubts upon the fire-resisting qualities of flat slab construction. Six and two-thirds bays out of fourteen have fallen in an almost shapeless heap of debris. The cement in the floors of the parts still standing is dehydrated completely through, and when a block of the floor slab, such as may be seen hanging from the reinforcing rods is detached, it may be broken easily by dropping it on the ground or rapping it against another such block. The floor slabs practically everywhere sag somewhat, and in many places are at the point of incipient failure.

If we consider the effect of heat upon concrete it may shed some light on the subject. Experiments upon the heat conductivity of concrete are rather few, but from those of Professor Ira H. Woolson, reported in the Proc. Am. Soc. Test. Mat., Vol. VII., 1907, p. 408, we learn that, when subjected to a temperature of 1,500° F. for two hours, a point 2 ins. from the exposed surface of a block of concrete had its temperature raised between 500° F. and 700° F. We learn also that dehydration of the cement crystals begins about 500° F. and is complete at about 900° F. Thus we may reason that dehydration has reached a point of 2 ins. below the surface of a piece of concrete after being subjected to a temperature of 1,500° F. for two hours. In the reinforced concrete warehouse under consideration we had a temperature that, according to those who saw it, "was like a blast furnace by 1 o'clock," and which at the time of the collapse, at 6 p.m., had lasted five hours. We have seen that it must have reached 2,300° F., and that, owing to the great quantity of fuel, must have been maintained practically constantly. The fact that the floor slabs are completely dehydrated is therefore not beyond comprehension, nor does it contradict the evidence of the experiments quoted.

In addition to this, Professor J. B. Johnson, in his "Materials of Construction," states that the working strength of steel decreases with a rise in temperature, and that this decrease takes place at the rate of approximately 4 per cent. for each 100° F. increase. If we take the evidence of the brick, which shows that a temperature of over 2,000° F. penetrated 2 ins. into a material of just about the same conductivity as concrete, and, from this, assume that the slab rods reached this temperature, it is evident that their working strength was reduced by about 80 per cent. For steel with an elastic limit of 35,000 lb. per square inch, this would mean that the available wearing strength was less than 7,000 lb. per square inch. In the columns this would not be of such grave importance as in the floor slabs. but in the slabs the stresses developed were in excess of this reduced allowable stress, as will be shown later. It is therefore probable that owing both to the weakening of the concrete in compression and the steel in tension, the floors failed first and carried the columns with them. Whether any other type of construction would have stood the fire better is, of course, a matter of conjecture.

DETAILS OF DAMAGE TO CONCRETE BUILDING.

As mentioned above, blocks of the concrete may be readily broken. At a depth of about an inch the aggregate thus exposed shows no noticeable effect, unless it be of some coarsely crystalline structure such as granite. One such piece of granite as big as a man's fist was easily crushed by the grip of one hand. Closer to the surface the aggregate calcined. The surfaces, being directly in contact with the fire, were everywhere calcined from ¼ in. to ½ in., and on those blocks which fell into the fire in the collapsed portion calcination is practically complete. At no point is there any evidence of fusion of the aggregate in the concrete. At first glance the material hanging from the cracks in the ceiling might be taken for fused concrete, but chemical analysis makes it practically certain that this is phosphatic material from Quaker Oats, which was piled in cases on the floor above. One of the basement columns looks as though fusion had occurred at this point. It was largely for the purpose of determining whether or not this was fused concrete that occasioned my second visit to the plant in Peterboro', and I found that conditions had changed considerably. No fusion was evident, but the large calcined masses are rapidly air slaking. This slaking process had already started at the time of my January visit.

SEPARATION OF WEARING SURFACE FROM SLAB.

All floors had been given a 1-in. wearing surface, and practically everywhere throughout the standing portion of the building this 1-in. surface has left the main slab. Although the wearing surface did not leave the floor slabs so noticeably under the box shooks, it is nevertheless calcined, and can be readily separated from the rest of the floor by tapping with a hammer. Professor Woolson has often stated the opinion that gravel aggregate reduces the fire-resisting properties of concrete, although his references are chiefly to quartz gravel. There is in this fire much to cause doubts as to the correctness of this opinion. In a number of cases the aggregate can be seen exposed. In the third storey this condition prevails over practically the entire ceiling, and patches of the remaining smooth surface are constantly dropping off. It would seem perhaps more correct, in the case of this building at least, to attribute this appearance to the calcination of the cement and gravel at the surface which allowed it to fall of its own weight. In the case of the deeply affected part of the slab around the column head in the foreground of Fig. 10, the result is more than likely due to the excessive compressive stress that existed in this locality. Exposed corners on horizontal surfaces suffered everywhere.

The reinforcing rods, even though protected in some cases with a very thin coat of concrete, were not oxidised until exposed. This might have been inferred from the fact that a thin coat of cement mortar will prevent rust, which is somewhat analogous to the black oxide formed on metal when subjected to fire; and wherever a slab failure occurred the broken ends of the rods were drawn down, as in any typical tension failure.

DAMAGE TO COLUMNS.

That the shape of columns has something to do with the damage they sustain is shown, although, with the exception of two in the background, the square ones appear not to be badly affected. But the appearance of all the columns shown is very deceptive, except, perhaps, those which are not so bad, being in a part of the basement where there was less combustible material. The dehydration spoken of before has affected the columns as well as the slabs, and extends to well inside the circular hooping. A month ago this was scarcely apparent. The weather in the meantime has caused the appearance of the concrete to change. A month ago a freshly fractured piece of dehydrated concrete could scarcely be distinguished from a good piece, but the weakness is now apparent, the mortar amongst the aggregate having more the appearance of dried blue clay. It is altogether possible that the hooping on the columns is largely responsible for their not failing. On all columns a few light blows with a hammer will detach large pieces of the concrete outside the hooping.

In heaps of combustible material burning on the outside gases would be formed within the pile and slight explosions might thus occur. The fact that they did occur is evidenced by a portion of the fifth floor from below. None of the material which came from this destroyed portion of the floor could be found on the fourth floor, but was lifted up and deposited around the opening. This is evidence of a slight explosion from below. Beneath the first floor there were one or two similar puffs. The fact that there could not have been any explosion of magnitude may be drawn from a consideration of several of the photos, which show that the building apparently settled straight downward. Other instances were noted of a number of columns which apparently dropped directly down.

EFFECT ON FIRE DOORS AND WIRED GLASS.

As to some of the details of construction, the solid metal fire doors stood the heat much better than the wood tin-clad doors when subjected to about the same heat condition. The trapdoors in the stairway are complete

ruins. From this we may reach the conclusion that the solid metal fire doors offer a more effective resistance to fire than do the wood tin-clad ones, and also that trapdoors never take the place of a proper stair enclosure.

Early in the fire the wired glass was completely gone, and may be found hanging in sheets down the outside of the walls, or running down the brick inside, as noted at several points. It must have kept the fire out of the concrete warehouse a little while, for the first fire to gain admittance did so through an open window near the north end of the building; but as to resisting severe exposures, its value is not great. It is possible that iron shutters, if they had been in working order, would have afforded much better protection, for even if they were not of the automatic closing type, the employees had time enough to close them by hand, as they did the openings in the wired glass windows. The metal window sash and frames, both hollow and solid, withstood the heat very well. The wooden frames were, of course, quickly consumed, and the plain glass was worthless.

EFFECT OF DESIGN AND LOADING ON FAILURE.

The permissible load on the first four floors varies greatly, depending upon the governing conditions. The diagonal bands have an excessive strength, and the straight bands are somewhat deficient in steel, but the weakest point in the design is in the column head areas. Owing to the fact that the slab is the same thickness throughout, the resisting moment of both steel and concrete over the column head is quite inadequate for the design load. This is more apparent in the wall panels than in the interior panels, and the effect is probably heightened owing to the fact that the building is but three panels wide. As these four floors were built before the laws governing flat slabs had been investigated to any extent, this need not be regarded as a reflection on the designer, for the class of work was excellent. The fifth floor, owing to its increase in thickness and the method by which this was accomplished, does not lend itself to computation. The sixth floor and roof represent the most modern methods of flat slab construction, with the exception of the fact that no drop heads were provided around the wall column caps where they were probably most needed, and the brackets provided on the columns were in no way reinforced. For shear, these brackets were sufficient, but they were very lacking in providing resistance to bending moments. Other than this, the class of work on the two upper stories was good.

From the location of the elevator shaft, the workmen found it very much easier to begin their loading from the north end of the building, and to fill both side aisles, reserving a trucking space down the centre of the building. This method of procedure naturally put the bulk of the load on the side panels where the structure was least able to carry it.

CONCLUSION.

The first lesson to be drawn from this conflagration is that absolutely "fireproof" construction is a chimera, for if heat is sufficiently intense and long enduring, no material can withstand it. This fact has been demonstrated in fires upon practically all the materials of "fireproof" construction, and now the latest type of building succumbs to it. The fact that concrete stood so well in the Edison fire has been hailed far and wide, and the severity of that fire was so great that it has become somewhat of a criterion of fire intensity. It seems almost sacrilege to say that at the Quaker Oats fire we had a more severe fire than at the Edison plant. Yet in the press of the time cuts are printed which show that not one of the large concrete buildings of the Edison plant had all the floors in full blaze at the same time. Nor did the fire remain in full intensity for more than an hour or two at any one place. Neither are there more abundant proofs of intense heat. But in the reinforced concrete warehouse at the Quaker Oats plant a fire occurred upon all the floors at the same time, of an intensity at least equal to that developed in the Edison fire, and it was seven hours after the fire started before collapse occurred. Even after two months there is considerable heat in the debris, and in some places there is fire still. It is not to be considered to the discredit of flat slab construction that a building of this type failed under such extraordinary circumstances. There was no fusion of the concrete, but the fusion evident at the Edison fire may have been due to the nature of the combustible materials at the points where this occurred.

Another point emphasised again is that hazardous features should be isolated, preferably in buildings with large window areas. In this case the large blank wall areas of the Dry House tended to hold the pressure. Consequently not only were the walls wrecked, but the fire was flung far into the mill. In several small explosions in Toronto wired glass has had the effect of holding the pressure, with consequent damage to walls, so the window areas recommended should preferably be glazed with plain glass.

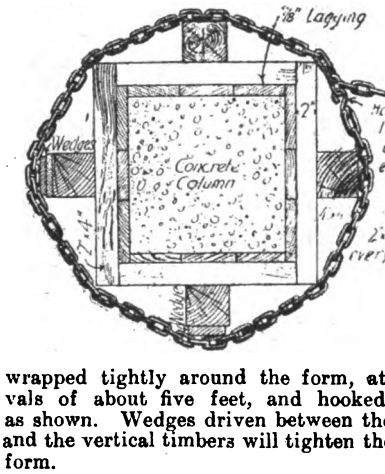
As far as the matter of fireproofing is concerned, if a fire is of sufficient intensity to heat a nine-inch floor slab through, it is evident that four and one-half inches of fireproofing would avail nothing. Moreover, if it is merely covered with mortar the reinforcing will not oxidise. In the usual design of flat-slab, the steel is not stressed to more than about one-third of its elastic limit under design load, so it could readily stand a temporary reduction in strength of 50 per cent. This would correspond to a rise in temperature of about 1,250 degrees F., at which temperature the cement in the concrete would be completely dehydrated. There is nothing to be gained, therefore, by excessive fireproofing of the rods.

Respectfully submitted,

T. D. MYLREA,
Engineer in Charge of Tests.

A SIMPLE COLUMN FORM TIE.

In the construction of reinforced concrete columns forms may be tied in a number of ways. One of the most simple methods is that shown in the illustration, taken from "Cement World." The lagging is spiked to wales spaced about every 16 inches vertically, as in common practice. A 4-inch by 4-inch timber is then placed along the entire length of the column, centred on the wales, on each side of the column. Chains are



wrapped tightly around the form, at intervals of about five feet, and hooked down as shown. Wedges driven between the chain and the vertical timbers will tighten the whole form.

The chains are usually placed between wales, rather than in the position indicated in the illustration. Care must be taken to have the chains wrapped in a horizontal plane, since when in other positions there will be a tendency to slip. In addition to the ease and rapidity with which the forms may be erected by this method, there are also the like advantages obtained in the removal of the forms from the finished columns. It is simply necessary to drive out the wedges in order to loosen the forms.

"Summer time" is to be reintroduced this year, as recommended by the Home Office Committee, throughout the United Kingdom, beginning at 2 a.m., Sunday, April 8, when clocks will be put forward one hour, and ending at 2 a.m., Monday, September 17.

JOINT FILLERS FOR GRANITE BLOCKS.

By HERMAN H. SCHMIDT.*

In this article, adapted from a paper prepared by the writer for presentation before the American Association for the Advancement of Science, a detailed statement of the requirements of ideal joint fillers is given, followed by a discussion of the various joint fillers used and available. In this discussion the defects in each are pointed out, and the writer suggests what in his estimation would be an ideal joint filler. There is also a brief discussion of methods for applying joint filler, and mention is made of the character of the cushion course which will give best results.

The writer's conclusion is that, with slight changes in the methods of work and improvement in the character of joint filler, granite pavement will have reached the highest state of development of which it is capable.

GRANITE BLOCKS NEARLY PERFECT.

The size and character of granite blocks, as now furnished by a number of quarries, are, in my estimation, as nearly perfect as we should require blocks to be. It is not necessary to enter into any additional refinements, so far as the blocks are concerned, because this would only add to their cost without increasing the perfection of the pavement. Improvements can be made in the methods of paving the blocks and in the character of the joint fillers.

I believe that all block pavements should be paved on as thin a cushion course as possible, depending, of course, upon the nature of the blocks, and this cushion course should be a mixture of cement and sand rather than sand alone. Joint fillers are still subject to much development, and at present we have no joint filler available which is ideal in all respects.

REQUIREMENTS OF JOINT FILLERS.

Cement grout joint fillers have been used for many years in this country as well as abroad, and I will point out later why, in my opinion, cement grout filler is not satisfactory, and why it is necessary to use a joint filler which has certain qualities that cannot be obtained from the cement grout. The characteristics of a good joint filler are:—

It must (1) be durable; (2) be waterproof; (3) be of moderate cost; (4) be easily manipulated on the street; (5) flow freely into the joint and fill all the voids; (6) adhere firmly to the paving blocks; (7) hold the blocks firmly in place; (8) not change its consistency under varying temperatures; (9) not disintegrate owing to traffic or the action of temperature or under water, and there must be no chemical action take place between the joint filler and street refuse; (10) be somewhat elastic; (11) permit of easily removing the paving blocks without breaking them; (12) set up and harden quickly.

It is now admitted that no joint filler, whether a bituminous one or cement grout, will properly fill the joints and hold the blocks in place, if the joints are first wholly or partially filled with small stone or gravel. The granite blocks are now laid so close together that no particles of stone or gravel larger than three-eighths or one-quarter of an inch will fall into the joint, and the voids in this very small aggregate are so slight that the proper penetration of the joint filler is prevented, and it is absolutely essential that the joint filler be uniform in density and strength from the top of the block to the bottom, if it is to do good service.

Coal tar and asphalt are the principal bituminous joint fillers used, but if these substances are used without the admixture of some mineral aggregate they have insufficient stability to properly hold the blocks, and, therefore, we mix fine, hot sand with them before the joint filler is placed in the joints.

PRINCIPAL JOINT FILLERS.

The principal joint fillers for granite block pavements are as follows:—Portland cement grout; a mixture of asphalt and sand; a mixture of coal tar and sand; a mixture of asphalt and coal tar with sand.

I will now point out where each one of

* Chief Engineer, Bureau of Highways, Brooklyn, N.Y.

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these joint fillers fails to meet the conditions which I have before stated are required for a good joint filler.

Portland cement grout fulfils practically all of the conditions required except the following:—(a) It is not elastic; (b) it does not readily permit of the removal of the blocks; (c) it takes too long to set and get hard.

Not being elastic, it does not provide for expansion, and unless the greatest care is exercised in mixing and applying the grout the expansion causes a fracture of the surface of the blocks, which has, in many instances, almost ruined what were otherwise first-class granite pavements. On busy streets it is essential not only that a street be opened quickly to traffic, but also that repairs to the pavement be made available for traffic with as little delay as possible. As the cement grout requires from eight to ten days to set, patches in the pavement must be protected for that length of time, and on very busy thoroughfares it is almost impossible to protect them properly. In removing blocks many are broken, as we have practically a monolithic mass, and it is extremely difficult to make a neat patch. To take care of the expansion and also to stop vibration, a bituminous joint is sometimes placed between the curb and the pavement. There are a few notable examples of splendid granite pavements with cement grouted joints, but the failures are very much more numerous.

ASPHALT AND SAND MIXTURE DOES NOT ADHERE.

The mixture of asphalt and sand fulfils the conditions I have imposed, with the following exceptions:—(a) It does not adhere firmly to the blocks; (b) it does not hold the blocks firmly in place; and these faults are, of course, very serious ones. The writer has seen a slab of this joint filler actually pulled out of the joints, showing that it did not adhere to the blocks at all.

The mixture of sand and coal tar fails to comply with the conditions, in that it too readily changes its consistency under varying conditions of temperature. The tar, if made very hard, will disintegrate; and, if made soft, will not stay in the joints, but flow towards the low places in the street. In either case the blocks become loose under certain adverse conditions, and are soon displaced.

The last filler mentioned—a mixture of asphalt, coal tar, and sand—comes, perhaps, as near fulfilling all the conditions which I have imposed as any filler which could be devised with the available materials. The addition of about 20 per cent. of hard asphalt makes the tar less susceptible to changes of temperature and greatly adds to its stability. It also enables a tar to be used which is not so hard as to be brittle. This filler has not been used to any extent, although some years ago such a mixture of tar and asphalt without the sand was used in connection with tar and gravel joints. Considerable experimentation is required to find the correct proportions of tar, asphalt, and sand to give the desired results, and the writer believes this joint filler should be given an extended trial by all those interested in obtaining the best results.

Prior to 1915 it was the general practice to carefully pour the joint filler into the joints, but this practice has now been superseded. The tar or asphalt joint filler must be constantly stirred in order to keep the sand in suspension, and it is very difficult to do this where the old method of pouring cans was used. The practice now is to agitate the mixture constantly, either by hand or by other means, up to the moment that it is thrown on the surface of the pavement. It is then merely brushed or squeegeed into the joints until they are full, leaving a thin skim of filler on the surface. This film on the surface protects the slight depressions in the top of the blocks, while it exposes the high places to the action of the traffic. The result is that by the time this surface coat is entirely worn off the high places on the blocks are worn down, giving a smoother pavement than when first laid.

Some improvements in the methods of laying the blocks and in developing a more satisfactory joint filler are all that is required to bring granite pavement up to the highest state of development of which it is capable, so that, at least in this class of pavement, we know with some degree of certainty the amount of service we can expect to obtain from it.

PAVING PROBLEMS.

It will only be a few years when horse-drawn vehicles will be entirely displaced by motor-drawn vehicles, and we will not then be subjected to the same criticism of our smooth pavements now arising out of the sympathy for horses.

If the weight of loads hauled by motor trucks is not curtailed by law (it is an open question whether or not it is wise to curtail this to too large an extent), then the pavement engineer must design a pavement to meet these enormous loads travelling at the rate of twelve or fifteen miles an hour.

There are now a number of streets in New York City where heavy and speedy hauling has brought about conditions which are almost unbearable from many standpoints. New pavements which should last from fifteen to twenty years have been ruined in one year. These tremendous vehicles cause adjacent houses to vibrate and ceilings to fall, and people living along the street are made almost desperate by the danger, noise, and dirt from this traffic. Not one of our present-day pavements will withstand this extreme traffic, and it may become necessary, if we must provide for such traffic, to set aside certain streets for it, and to pave such streets with iron or steel, as the conditions more nearly resemble a busy railroad yard than an ordinary city street.

Building Intelligence.

WEST MALLING.—The handsome bequest of the late Mr. Frederick Andrew, solicitor, of Lincoln, to found a convalescent home for poor gentlewomen, honestly striving to earn their own livelihood, is in process of bearing good fruit. The trustees—Major Genny, R.A.M.C., and Mr. H. D. Thompson—in accordance with the terms of the bequest, have purchased the Manor House, West Malling, Kent, and in doing so have had regard to the express desire of the testator that the building should be of picturesque elevation and constructed within and without of the best and most lasting materials, especially as regarded the interior woodwork. He also wished that it should be beautified from time to time, as the funds at the disposal of the trustees might permit. It was left to the discretion of the trustees whether they should purchase a site and erect a building themselves or buy a suitable house. They decided to adopt the latter course, having regard to the position of the building trade at present. The Manor House is an Early Georgian structure and contains five reception rooms and about twenty bedrooms, and stands in gardens of about eleven acres. There is a park, with delightful views, and a lake, the whole comprising about seventy acres. Certain alterations are necessary, but having regard to the present restrictions on building, it is not contemplated to carry these out at present. The home will not be actually open for some time. Meanwhile, Mr. H. G. Gamble, Lincoln, is preparing plans with a view to the carrying out of the necessary improvements as soon as circumstances permit. It is understood that accommodation will be provided for about twenty guests, and preference will be given to applicants from Lincoln or the county. It is estimated that there will remain a permanent endowment fund for the purpose of carrying on the institution of over £100,000.

The President of the Board of Trade has appointed a committee to consider and report what steps should be taken, whether by legislation or otherwise, to ensure that there shall be an adequate and economical supply of electric power for all classes of consumers in the United Kingdom, particularly industries which depend upon a cheap supply of power for their development.

Correspondence.

BUILDERS AND THE BLINDED SOLDIERS' BAZAAR.

To the Editor of the BUILDING NEWS.

Sir,—Will you permit me to ask your readers if they will be so generous as to give support by gifts in cash or kind to the Blinded Soldiers' Bazaar, which is to be held at the Royal Albert Hall during the second week in May.

I feel sure that no flowery phrases are needed to evoke their sympathy for the men who have made so great a sacrifice for the freedom and future prosperity of this country.

So may I please just leave the matter like this:—

If you who read this letter think that the fight which Britain is making is a just fight, if you honour and respect the men who have represented you in that fight, if you have sympathy for those who in thus representing you have suffered so terrible a deprivation as the loss of their sight, you will send a contribution, be it large or small, be it in cash or kind, to the Secretary, Blinded Soldiers' Bazaar Committee, 6, Bayswater Hill, London, W.—Yours faithfully,

ARTHUR PEARSON,
Chairman, Blinded Soldiers' and Sailors' Care Committee.

St. Dunstan's, Regent's Park, N.W. (near Hanover Gate), March 24, 1917.

PROFESSIONAL AND TRADE SOCIETIES.

ARCHITECTURAL ASSOCIATION OF IRELAND.—The Rev. C. Lawless, C.C., was the lecturer at the meeting of the Architectural Association of Ireland, held last week in the rooms, South Frederick Lane. His subject was: "Architectural Snapshots in Many Lands." In the course of his travels round the world, Father Lawless has obtained a unique collection of views, and the exhibition which he gave showed that he has a keen appreciation of the beautiful in art and in nature. The better known architectural features of the various countries were not shown, the lecturer devoting his address and exhibition to less familiar, but equally interesting, "snaps." Denmark, Norway, Russia, Austria-Hungary, Turkey, the Holy Land, Egypt, Tunisia, Italy, France, Spain, Portugal, and other countries contributed numerous specimens of beautiful architecture. At the close of the exhibition Mr. H. G. Leask, President of the Association, conveyed the thanks of the members to the lecturer.

LONDON ASSOCIATION OF MASTER DECORATORS.—At the council meeting held at Holborn Restaurant, on Friday, March 16, at 4.30 p.m. Present:—Mr. H. G. White, Mr. J. Milton, Mr. T. S. Rowden, Mr. Chas. H. Bessant, Mr. F. De Jong, Mr. Edwin Lott, Mr. J. Morison, Mr. A. Andrews, Mr. T. Willson, Mr. M. C. Cowtan, Mr. Geo. Anderson, Mr. C. E. Campbell, Mr. A. G. Rhind, Mr. F. Dakin, Mr. W. Stewart-Greene, Mr. C. A. Hindley, Mr. C. L. Roberson, Mr. H. Costa and Mr. A. Davidson (secretary). Mr. M. C. Cowtan occupied the chair. The association has at present under consideration a suggestion to co-operate or affiliate with the London Master Builders' Association, but the negotiations are at present at such a stage that there is nothing definite to report until the matter has been further dealt with. Application having been received in November last from the Operatives' Society for an advance of wages and a revision of the working rules, the secretary was instructed to write to the men's union, asking for their proposals as to the alteration of rules. The Restricted Occupations Order was considered at great length in conjunction with a memorandum prepared by the secretary of points which in his view might be laid before the Director General of National Service, and it was reported that as the result of an emergency meeting held to consider the matter, the secretary had written to the Director General of National Service asking him to receive a deputation on the subject. It was unanimously resolved to confirm the action of the said meeting, and a deputation of six representative members of the trade,

including the secretary, was appointed. It was also agreed that in the event of the deputation not being received, a memorial based upon the aforesaid memorandum should be presented to the Director General. It was also agreed to co-operate with the National Association in the matter, provided the London association retains its right to nominate its own representatives in any deputation which may be formed.

NATIONAL PAINTERS' AND DECORATORS' COUNCIL.—A National Painters' and Decorators' Joint Council has been established, the history of which is as follows:—In December last the Secretary of the National Association of Master House Painters and Decorators of England and Wales (Inc.) received from the Secretary of the National Amalgamated Society of Operative House and Ship Painters and Decorators an invitation for the Executive of the first-named society to meet the Operatives' Executive for the purpose of discussing matters of common interest. The invitation was accepted, and at the Salford Town Hall, on December 21, the following resolution was passed:—"That the Executive Committee of the National Association appreciates the spirit in which they have been approached, and trusts that this meeting may be the forerunner of a permanent committee to consider mutual interests." The meeting was adjourned to January 25, 1917. The Executive of the National Association of Master House Painters and Decorators of England and Wales (Inc.) then met separately on January 16, and recommended that the General Council of the same Association should endorse the proposal to form a Joint Council. The adjourned joint meeting was held at Salford on January 25, and the following resolution was passed:—"That a Joint Advisory Council be set up composed of seven members of each side and the Secretaries, that the meeting be held quarterly, and that the chair be occupied by representatives of each side alternately; and, further, that it be a recommendation that local Joint Committees be established on similar lines." The formal consent of the General Council of the National Association of Master House Painters and Decorators of England and Wales (Inc.) was given on February 22, and the National Painters' and Decorators' Joint Council is now an established fact. Already some progress has been made with the consideration of such questions as the position of demobilised apprentices after the war, and the provision to be made for partly disabled soldier journeymen. In addition, there are many subjects down for future discussion, and it appears likely that the Joint Council will have as much work as it can well manage for a long time to come. The Joint Secretaries are Messrs. W. G. Sutherland and J. Parsonage.

PARLIAMENTARY NOTES.

NEWSPAPERS AND PAPER STOCKS.—Mr. Runciman on Monday asked the Prime Minister whether, in view of the fact that a monopoly in paper for newspapers would lead to a monopoly in the means of expressing public opinion, the Government had yet taken any steps to carry out the suggestion that stocks of paper for newspapers should be pooled under the control of the Paper Commission and distributed on an equitable basis between the newspapers of the United Kingdom in existence before the import of paper and pulp was first restricted. The Chancellor of the Exchequer, in reply, said:—Particulars of stocks held by newspaper proprietors have been collected by the Paper Commission, who have reported the result of their inquiries to the Board of Trade. The Report has only just been received, and it has not yet been possible to examine it carefully. There shall be no avoidable delay in announcing the Government's intentions in regard to the suggestion referred to by my right hon. friend. Mr. Chancellor.—Will fresh newspapers be allowed to come out? Mr. Ginnell.—Yes, if they support the Government. (Laughter.) The Chancellor of the Exchequer.—That question should be put to the Board of Trade. Mr. Pringle.—Will a circular be issued to Cabinet Ministers suggesting that no further capital should be placed in new newspapers?

Our Office Table.

As part of their general scheme of improvements, the Port of London Authority have adopted proposals which will have an important bearing on the future of the Royal Victoria Dock. It has been decided to construct on the south quay of this dock two double-storey sheds, of a total area of 187,680 square feet, the ground floors of which will be available for use in connection with the loading of ships, and the upper floors for the warehousing of wool, fibre, grain, or general cargo. The south quay front will be made suitable for the use of large ships, cranes will be erected, and railway as well as roadway accommodation will be provided at the rear of the sheds. To the south of the proposed buildings and the railway and roadway serving them, two single-storey sheds, of a total area of 92,160 square feet, will be put up. The effect of the improvements will be materially to develop the general shipping facilities on the south side of the Victoria Dock, which has hitherto been more particularly identified with the grain and flour trades.

Professor C. H. McLeod, who has been secretary of the Canadian Society of Civil Engineers practically during the life of that organisation, has resigned. Professor McLeod during all these years has carried on his work at McGill University in addition to that demanded of him in connection with the Canadian Society. The secretarial work has now reached such proportions, however, that Professor McLeod finds it impossible to give it the necessary time. The new secretary, Mr. Fraser S. Keith, will devote all his time to the work.

"Laxton's Price Book for 1917" (London: Kelly's Directories, Ltd.) is the hundredth successive annual edition of the book. The arrangement of the book has not been in any way altered this year, but for the first time a new feature has been introduced in the shape of a list of "specialities" extending over thirty closely-printed pages. This new feature should be of much service to those requiring to be able to at once trace the firms by whom the "specialities" used in the building trades are manufactured. The list, in fact, gives facilities for at once tracing the names and addresses of the manufacturers of over one thousand such specialities. It is hoped to make it more and more complete year by year, and we have very little doubt but that it will be found of service to all interested.

Prices paid by the Home-Grown Timber Committee for timber were criticised last week during the hearing of a claim by the Duchess of Albany before the War Losses Commission in respect of trees requisitioned from Esher Common. The claim amounted to £9,179, and an agreement had been made with the Committee to purchase the timber at 9d. per cubic foot. "Can you explain," asked the chairman (Sir J. Woodhouse) of Mr. Stenning, the Committee's valuer, "why this is a much higher rate than usual?"—"It is the rate I have been purchasing at for the last twelve months," was the reply.—Can you explain how the Home-Grown Timber Committee has been able to obtain timber at a lower price?—Possibly the timber in those cases was more accessible.—The Chairman: There has been a great deal of criticism passed upon the action of the Committee in the Press, and it is the duty of the Commission to see that the Crown is not paying more than it ought to pay.—The case was adjourned for further evidence.

Those of us, says the *Daily Chronicle*, who are bewailing a shortage of paper which will prevent our walls from receiving a new covering this Easter sigh for such a remarkable paper as covers the walls of Messrs. Coutts's bank in the Strand. It was taken from the wall of the board-room in the old building at the time the bank crossed over from the south to the north side of the Strand twelve years ago. Even then it was at least a century old! Lord Macartney, the first British Envoy to China, sent it from the Far East to his friend Thomas Coutts. Its history prior to 1800 is unknown.

The Office of Works will shortly be taking over the building of the Institution of Electrical Engineers on Victoria Embankment for the purpose of housing a Government department, and other arrangements will have to be made with regard to the future meetings of the institution. We understand that it is the intention to lay a new flooring to the lecture theatre in order to bring the whole on the level of the entrance doors. This is the third building of the kind that the Government has taken full or partial possession of. Within a very few weeks of the beginning of the war the Institution of Mechanical Engineers' building in Storey's Gate was first taken over in part, and very soon completely, while later on certain portions of the new building of the Institution of Civil Engineers were made use of. The lecture theatre of the latter, however, is still available, and it is possible that arrangements will be made by the Institution of Electrical Engineers to hold its meetings there, as is done by the Institution of Mechanical Engineers.

The Minister of Munitions has issued an order that no person shall, until further notice, purchase, sell, or, except for the purpose of carrying out a contract in writing existing prior to such date for the sale or purchase of spelter, enter into any transaction or negotiation in relation to the sale or purchase of spelter situated outside the United Kingdom except under and in accordance with the terms of a licence issued under the authority of the Minister of Munitions. No person shall purchase or take delivery of any spelter situated in the United Kingdom except under and in accordance with the terms of a licence issued under the authority of the Minister of Munitions; provided that no such licence shall be required in the case of any sale, purchase, or delivery of such spelter for the purpose of necessary repairs or renewals involving the use of not exceeding 1 cwt. of such spelter. No person shall use any spelter for the purpose of any manufacture or work except for the purpose of a contract or order for the time being in existence certified to be within Class "A" or for the purpose of necessary repairs or renewals involving the use of not exceeding 1 cwt. of spelter. All persons shall, in the first seven days of each month, commencing with the month of April, 1917, send in monthly returns of stocks, deliveries, etc.

A bulletin just published by the American Department of Agriculture on the subject of mahogany records, among other interesting facts, the bewildering ambiguity of the term "mahogany." True mahogany is produced only by two closely related species of tree. Swietenia mahagoni (Jacq.) and Swietenia macrophylla (King), both natives of tropical America. The name "mahogany," with or without some qualifying word, such as "Indian," "Madeira," "African," "Philippine," etc., is, however, applied to cabinet woods grown in a great many parts of the world. These so-called mahoganies belong to sixty-seven distinct species, of forty-one genera, and they are scattered through eighteen families of the vegetable kingdom. Of some of the West African species the botanical status is unknown. To add to the confusion, true mahogany has many names and several more or less distinct varieties are recognised commercially.

Paisley carpenters and joiners have been granted 1d. increase, making their wages 1s. an hour.

The new wooden chapel erected in the grounds of the Keighley Military Base Hospital, at Morton Banks, was opened for divine service on Saturday afternoon by the Ven. Archdeacon Henry Armstrong Hall, Deputy Assistant Chaplain General in the Northern Command.

The death is announced, on the 25th inst., at 23, Kempshott Road, Streatham Common, S.W., of William Shears, Member.Inst.C.E., late of The Limes, Clapham Common, and Bankside, Southwark, late "Father" of the Armourers' and Brasiers Company, in his ninety-sixth year.

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TRADE NOTES.

Messrs. Ambrose Poynter, F.R.I.B.A., and George H. Wenyon, M.S.A., have removed from 9, South Molton Street, W. (Mayfair, 4554), to 8, Grafton Street, Old Bond Street, W.1. (Gerrard 2487).

Boyle's latest patent "Air-Pump" Ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, E.C. 1, have been employed by Messrs. the Darlington Forge Co., Ltd., Darlington.

We have received a communication stating that the heating chamber to the Grimsby and District Hospital has been a source of trouble on account of flooding after heavy rains. The difficulty has been overcome by giving the floor and walls a Pudloed cement rendering.

We are asked to mention that a reader whose curiosity had been aroused by repeated advertisements in this journal wished to prove whether Portland cement was really watertight. He constructed two fish-ponds—one with cement and sand and the other with Pudloed cement and sand. The former required to be constantly supplied with water to maintain the level, but the other was proved non-porous. The makers of Pudlo inform us that they will be glad to send, free of charge, to any interested readers, sufficient Pudlo to enable them to make a practical test.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

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TENDERS.

***** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.**

ROCHFORD (Essex).—For converting shed into a stable, for the Rochford Rural District Council:—

S. Morden	£24 10 0
A. Cook (accepted)	24 0 0

DURHAM.—For supply of whinstone, slag, tar macadam and tar required for their district roads during year ending March 31, 1918, for the Durham Rural District Council. Mr. G. Gregson, surveyor:—

Accepted tenders:—Whinstone: R. Summerson and Co., Ltd., Cockfield; Ord and Maddison, Ltd., Darlington; Monkhouse and Peart, Wearhead; Cradock, Allison, and Co., Ltd., Eaglescliffe.

Slag: Sir B. Samuelson and Co., Ltd., Middlesbrough; W. Barker and Co., West Cornforth; Witton Park Slag Co., Witton Park.

Tar macadam: Sir B. Samuelson and Co., Ltd.

Tar: Oil Products and Residuals Co., Newcastle-on-Tyne.

LONDON, W.C.—For supply of 24 "A" pattern hydrant meter covers and frames, for the Westminster City Council:—

Ham, Baker, and Co., Ltd... .. £78 0 0
(Recommended for acceptance.)

LONDON, W.C.—For supply of various articles, for the Westminster City Council.

Tenders recommended for acceptance:—3 in. sawn stone flags: J. Brooke and Sons, 11s. per yard; H. Heys and Co., Ltd., 11s. 6d. Cartage of broken granite and tarmac from railway stations at Paddington, Nine Elms, and South Lambeth to streets and depôts in the City: H. Sabey and Co., 5s. 6d., 4s. and 4s. per ton for broken granite and 6s. 3d., 4s. 9d., and 4s. 9d. for tarmac. 500 tons of granite: Mountsorrel Granite Co., Ltd., delivery at Somerstown, 15s. 3d.; Groby Granite Co., delivery at Royal Mint Station, 15s. 8d.

LONDON.—For the continuation of their contract to supply to the Westminster City Council Portland cement for the twelve months ending March 31, 1918:—

Wakeley Bros. and Co., Ltd. (accepted).

LONDON.—For removing and refixing gravestones at Fulham Cemeteries, for the Fulham Borough Council:—

G. Solley, at an increase of 10 per cent. on existing schedule prices.

NELSON (LANCS).—For supply of brass fittings during one year, for the town council:—

Baxendale and Co., Manchester.
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SLEAFORD.—For supply of about 2,250 tons broken X Granite, 250 tons XX and XXX granite and 250 tons of ¾ in. clean granite chippings, to be delivered, carriage paid, at Sleaford Station, for the Sleaford Urban District Council.

Accepted tenders:—Groby Granite Co., Ltd., Mountsorrel Granite Co., Ltd., and Enderby and Stoney Stanton Granite Co., Ltd.

SWAFFHAM.—For supply of road material, etc., for the Swaffham Urban District Council.

Accepted tenders:—Granite, Mountsorrel Granite Co.; broken stone, C. R. Ayton, Wymondham; tar, Swaffham Gas Co.; steam rolling, Eddison Steam Rolling Co.; chalk, G. Jeffries; carting road material, J. Scott, Ashill.

Mr. G. H. Hamley, who has held the position of borough surveyor of Lowestoft for nearly thirty-one years, has resigned the position. In his letter of resignation, which was read by the council on the 14th inst., he said that the strain and anxiety were more than he could bear.

The death is announced of Mr. C. H. Bradshaw, divisional surveyor for the North-Eastern division of the county of Middlesex, which took place suddenly on Monday, the 12th inst., at his home, Palmer's Green, N. Mr. Bradshaw has acted in the above capacity (under Mr. Wakelam, county engineer) for the last thirteen years, previous to which he was on Mr. Wakelam's office staff for about four years.

LIST OF TENDERS OPEN.

BUILDINGS.

April 2.—Erection of an Office in brickwork for their traffic controller at Adelaide Station, near Belfast.—For the Great Northern Railway Co. (Ireland).—T. Morrison, Secretary, Amiens Street Terminus, Dublin.

April 4.—Improvement in Lighting and Ventilation of Sydare National School, Ballinamallard. Plans and specifications at the School, between 9.30 a.m. and 3 p.m. Tenders by April 4.

ENGINEERING.

April 30.—Installation of a Vacuum Steam-heating System, and Supply and Erection of Power-house Buildings and Chimney.—For the Canterbury University College, Christchurch, N.Z.—The Registrar of Canterbury College, Christchurch, N.Z.

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

PAINTING.

April 2.—Inside Painting, Colouring, etc., required to be done at various schools.—For the Bradford Education Committee.—Specifications and form of tender at City Architect's Office, Town Hall, Bradford. Sealed tenders by 9 a.m. on April 2 to the Director of Education, Town Hall, Bradford.

ROADS AND STREETS.

April 2.—Granite, Kentish Rag, Kentish Flints, Gravel, Screenings, and Sand; carting of materials, hire of horse, harness and man for occasional work; and steam road-rolling for one year.—For the Billericay Rural District Council.—C. E. Lewis, Clerk, Union Board Room, Billericay.

April 2.—Asphalting and Repairing Footpaths in the District.—For the Melton Mowbray Rural District Council.—A. H. Marsh, Clerk.

April 3.—Granite Setts for Tramway Purposes (One Year).—For the London County Council.—General Manager, London County Council Tramways, 62, Finsbury Pavement, E.C.

April 3.—About 410 tons of Slag Tarmac, 1,000 tons of 2½ Devon or Welsh Basalt, and 14,000 gallons of Dehydrated Tar (six months), to be delivered free on rail at Aldershot Town Station.—For the Aldershot Urban District Council.—D. L. Griffiths, Clerk.

April 3.—Tarred Slag (one year).—For the Cudworth Urban District Council.—W. T. Lynam, Surveyor, Council Offices, Cudworth, near Barnsley.

April 7.—About 600 tons 1½ in. to 2½ in. Tar Macadam, 25 tons ¾ in. ditto, and 25 tons ¼ in. Slag and Dust, to be delivered London Road Wharf, Derby.—For the Alvaston and Boulton Urban District Council.—W. J. Holbrook, Clerk, Alvaston, Derby.

April 9.—Hoggin, Flints, and Ballast.—For the Whitstable Urban District Council.—J. F. Whichcord, Clerk, Council Offices, Whitstable.

April 10.—Slag, Kentish Flints, Local Materials, and Team Labour and hire of a steam road-roller.—For the Lexden and Winstree Rural District Council.—E. B. Potter, Acting Clerk, Victoria Chambers, Colchester.

SANITARY.

April 6.—Ten tons of Disinfecting Powder and a quantity of Disinfecting Fluid, in quantities as may be required (one year).—For the Dewsbury Corporation.—H. Ellis, Town Clerk, Dewsbury.

April 7.—Construction of a length of Sewer in Edge Lane, near Vaughan Street, Royton, with manholes, etc.—For the Urban District Council.—E. Harrison, Clerk, Town Hall, Royton.

The death is announced of Mr. Robert J. Charters, burgh surveyor and sanitary inspector of Jedburgh.

Mr. P. H. Palmer, the President-elect of the Institution of Municipal and County Engineers, will be glad to receive offers to read papers at the forthcoming annual meeting of that body at Hastings.

At an assembly of Royal Scottish Academicians, held last Wednesday in Edinburgh, Mr. G. Washington Browne, R.S.A., was elected treasurer to the Royal Scottish Academy, in room of the late Mr. Hippolyte J. Blanc.

At Edinburgh John Brown Hay, joiner and contractor, was found guilty of contravening the Prevention of Corruption Act in connection with the purchase of military supplies required by the Dundee Territorial Force Association, and was sentenced to six months' imprisonment and to pay a fine of £500. It was stated that the secretary of the association, now dead, being in poor health and overworked, Hay volunteered his assistance in going round to various shops and procuring supplies, and that he accepted commissions from a number of tradesmen, amounting to about £800. Hay was acquitted on a further charge of defrauding the association.

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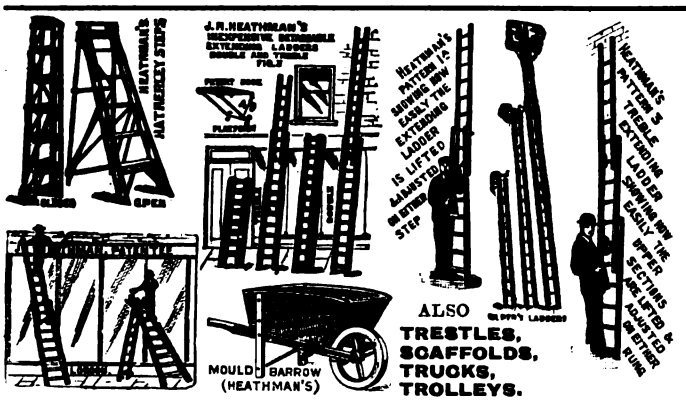
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April 4, 1917. Volume CXII.—No. 3248.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.2.

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OUR ILLUSTRATIONS.

The Camera, from Brasenose College, and View of "The High," Oxford, from top of the Magdalen Tower. From pencil drawings by Mr. Fred Richards, A.R.E., A.R.C.A.

Queen's House, now finishing in Kingsway and Lincoln's Inn Fields, London, W.C. Details of the Kingsway front. Mr. M. E. Collins, F.R.I.B.A., Architect.

Hotel de la Cie Générale Transatlantique, Rue Auber, Paris. M. Hénri Paul Nénot, R.I.B A., Royal Gold Medallist, 1917, Architect.

La Nationale Assurance Office, Paris. M. Hénri Paul Nénot, R.I.B.A., Royal Gold Medallist, 1917, Architect.

Currente Calamo.

The Manchester City Council last Wednesday appointed a special committee to inquire into the present shortage of houses in the city and to make recommendations for remedying it in readiness for demobilisation. Councillor Day, who moved the resolution, said the position of the housing problem was serious in Manchester before the war; it had become intensified since, and it would be greatly aggravated when demobilisation came. In the six years ended in 1903 there were 20,157 houses erected in the city as at present constituted; in the next six years 18,570; and in the six years ended in 1916 only 7,061. Each year after 1909 there had been a gradual diminution, until last year, instead of an average of 3,616, such as was experienced in the first six years referred to, only 119 new houses were erected. In the whole of those eighteen years—excepting 1915, which was phenomenal—there was little variation in the number of marriages, which equalled two to every house erected. From that it might be assumed that if one new house were erected for every two marriages the supply would equal the demand. In the first six of the years taken the proportion of new houses to marriages was 55.5 per cent.; in the next six years, 50.07 per cent.; and in the last six years only 14.8 per cent. The average number of marriages in Manchester was approximately 6,000 per annum. In 1915 it rose to 15,996, indicating that when hostilities ceased thousands of young men who had gone to the front would have to find homes. Unless it were coped with, this house famine would inevitably tend to perpetuate the evils of overcrowding. Alderman Turnbull, in seconding the resolution, said there never was a greater shortage of houses at any period of the city's history. At present there was hardly a single weekly house to be had. That this is so we know, and congratulate the City Council on its action. Its example should be followed largely, for there is hardly a town of any importance in England where a similar deplorable condition of things does not exist.

In this connection we are very glad to note that, as will be seen by an advertisement on our front page, to which we call special attention, the National Federation of House Builders, which was formed at a recent meeting at Manchester, called by the Manchester and District Builders' Association, at which the Liverpool and District Association of House Builders, and representative builders from Sheffield, Nottingham, and other important towns were present, has called a meeting on Wednesday, April 18, which we hope all readers interested will attend. The present need for the expression by practical housebuilders of their opinions with regard to the future of the house-building industry is most pressing, and its intimate connection with the wide question of the housing of people is apparent to all but some of the well-meaning, but ill-informed, philanthropist workers who are propounding remedies which are no remedies, and discussing methods which are certain to prove abortive. We are very glad that this association has been formed, because the urgent need for a national organisation of house builders has long been recognised by all connected with the trade. We have suggested it long ago, because we are convinced that by the co-operation of really practical men alone is the most pressing problem of our time likely to be solved, and the most urgent need of the present day adequately met. The federation is already assured of the enthusiastic support of the various house builders' associations throughout the country, and of many large and influential house builders in various centres.

We are probably before long to add a Minister of Health to the long list of new heads of Government Departments. It is stated that the Report of the Unionist Social Reform Committee on the administration of Public Health, which began its labours about three years ago, is ready and will be shortly published. The main conclusions arrived at are said to be that the care of public health is a duty of public authority, and that there are serious faults in its present fulfilment. The supervision of public health is at present distributed among six Government offices. The Home Office has actually eight separate public health staffs. Assuming the case for reorganisation of the Central Department, the committee lay down the general proposition that a central health authority should be constituted. The claims of the Local Government Board and the National Health Insurance Department are examined, with a decided preference for the former as a basis for the new Department. Lord Rhondda, the President of the Local Government Board, has independently come to the same conclusion, and, the *Times* says, he would probably concur in the further recommendation of the committee that the change which they propose should be accompanied by the re-christening of the Board. We shall await developments with due resignation. Perhaps nothing more really is meant than a new name for the Local Government Board, which body, on the whole, has certainly better claims to recognition than the National Health Insurance Department.

It was said by many in the days of the Third Empire in France that Baron Haussmann, who transmogrified Paris, was specially charged by Napoleon the Third to widen all the streets to their utmost limit, so that artillery might sweep away revolutionists, and to pave them with asphalte to prevent the building of barricades with stones. It is being similarly suggested that Petrograd was designed primarily to ensure the safety of the Tsars and their entourage from popular uprisings. Peter the Great built a fortress on the Neva where Petrograd stands now. The site was drained, two canals dug, and the gilded spire of the Admiralty became the centre of the city. From the gardens in front of the Admiralty three roads run in straight lines to the suburbs, with three guns in the gardens, one pointing down each artery, and the roads could be swept with shell. Moreover, each road crosses the two canals, and a destroyed bridge would immediately cripple any line of advance. The same method of protection was planned for the Royal palaces. Tsarskoe Selo, ten miles from Petrograd, the country seat of the Tsar, is separated from the capital by an exposed road on which shrapnel could be rained with terrific effect. Peterhof, the chief summer Royal residence, is nineteen miles away from Petrograd. The extensive grounds and

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surrounding buildings would hold an army corps. So far, as in Paris in 1870, all precautions proved futile. May they similarly fail if, as some fear, the "Man on Horseback" presently appears and seeks to strangle freedom as Michael Fedorovitz, the first of the Romanoffs, did in 1613, after the seven years interval of liberty which followed the downfall of Feodor the First, the last of the race of Ruric, which had ruled Russia for 700 years.

The tungsten filament for electric lamps has made fortunes for many Germans. The use of pure coherent tungsten was first found out by a French chemist. But in Germany, where they have for years employed research engineers, which we have never done, they worked it out industrially and commercially, protecting the process with patents. The recent case of "British Thomson-Houston Co., Ltd., v. Duram, Ltd.," shows that one of these patents as to tungsten filaments, at all events, is invalid in Great Britain. The Court of Appeal, in confirming the decision of Mr. Justice Astbury, based their judgment on the point of principle that there was no subject matter to support the patent. The so-called discovery of drawing tungsten into wire was no discovery at all. The use of heat in the working of metals is an elementary truth in metallurgy. Great heat was employed here, and so a fine tungsten wire was obtainable by anyone working the metal. That patent, therefore, is wiped out, and it is now open to our own manufacturers to make these filaments and lamps, as they have for years been made in Germany and America most profitably. It is often said that no patent is any good until it has been fought out in the Law Courts. There are, doubtless, very many similar manufacturing patents of this kind which would not stand the strain of such fighting. Our people are often too slow in seeing these things and too chary of running the risk of losing in litigation. But the real lesson to be learnt from this business of tungsten filaments is that we must give more time and money to research in chemistry and engineering. This is only one of hundreds of cases in which German industry and thoroughness have worked together to take from us good markets which we could have made all our own. There is a great future for electric work, and it may be hoped that our lesson has now been learnt at last.

The recently issued return, as altered by appeals, etc., of the total of the County of London valuation lists which come into force on Friday next, despite existing conditions, show no decrease. On the contrary, there is a satisfactory increase, having regard to present times. The gross value represents a total of £55,533,572, which shows an increase of £160,092. The rateable value is given at £45,363,520 10s., increase £150,337. The assessable value is as follows:—General county £45,356,943, increase £150,392 10s.; special county £34,496,131, increase £107,576 10s. London has stood the strain of three years' war well, having maintained its almost normal condition, if we take into account certain exceptions as to the absence of men and a lessening of traffic. Zeppelin visits notwithstanding, London is confident, and with good reason, for, in spite of the muddles of our rulers and the madness of mischief-mongers elsewhere, she knows that her position is unassailable.

THE EAST BIRMINGHAM TOWN-PLANNING SCHEME.*

THE SECOND TO MATURE.

In reference to your quotations in your issue of December 27 last, taken from my article in the *Land Union Journal* of that month, I have been interrogated by an agent of an estate of over 10,000 acres, and invited by the surveyor to one of the most important cities in the North, to reply publicly in *your paper* to certain questions, the desire of both being to facilitate the building of artisans' houses on proper lines on business principles. I think the question can be consolidated under three heads.

First, were the complaints I made as to the above scheme applicable to other towns or were they only of a local nature? I, of course, only give my own ideas about these questions. I think a landowner in any locality may suffer unfairly until there is an appeal. I cannot say what control the Board had over the committee or vice versâ, but the following example answers this question better than any general statement of mine. The local committee scheduled for factory sites a rectangular 12 acres corner plot of high land, at first sight quite a reasonable proposal, because in that case road-making would not be necessary. It adjoined on two sides over 100 acres of low-lying land, most suitable for factories with a long railway frontage; but the owner, a builder, who had recently purchased the land for the erection of houses (for which it is really more suitable, as two sides adjoined the built-up portion of the city where houses were wanted badly), made strong objections, and requested of the Local Government Board's Inspectors at the inquiry that the whole should be scheduled for houses; and also in writing on three other necessary occasions with an accompanying plan showing how he proposed to develop the land by continuing an approach road (reserved through the built-up frontage to a main road with tramway along the south side of the land) over a 30-in. main sewer in the shape of the letter L to a public road on the west side. An old agricultural fence intersected the land east to west, and the Board, evidently with a desire to meet the builder's views, scheduled the southern field for houses and the northern field of about 5 acres for factories. This made a regular hash of things, because the costly road had to be made throughout, so the cost of the northern part of the road from the bend entirely through the northern field was practically wasted for factory sites; and, further, the narrow strip of land left in the northern field about half an acre on the southern side of the road was not only rendered comparatively useless for factories on account of its narrowness and acute angles, but it actually cut off the road frontage to land scheduled for houses in the southern field. It may seem incredible, but they did not even follow the line of the main sewer under the site of the proposed road near and almost parallel with the fence. This was clearly not the doing of the local committee, and it cannot be urged that the Board did not consider the point, for it was their own doing; neither can it be urged that they had not time to consider it, for they actually did so.

I feel, however, I should not answer the question quite frankly without stating there are certain local influences; for instance, there are four private schemes of development, which people who come to Birmingham to gain town-planning ideas are taken to see; possibly the Inspectors were taken.

First, there is Bournville, excellent, and well worth inspection, but it is a suburb of Birmingham, about four miles out, and was developed before its annexation to the city, and therefore by cheaper roads, and it is built in connection with large works adjoining. The owners are philanthropic people, and that, no doubt, had some influence, but with few exceptions it does not supply the artisan's house. Secondly, there is the Harborne Tenants' estate, which is a pleasant suburban development, but the costly Birmingham roads were not enforced, and with a few exceptions this does not supply houses for the artisan. Thirdly, there is the Ideal Benefit estate, which is excellent, but this, again, does not provide houses for the artisan. Lastly, the Sutton's Charity estate, in East Birmingham, is exceptionally good for small houses, but they may only pay 2½ per cent. interest on the capital, so that is not a practical proposition.

Now, my point is that, although these developments are excellent in themselves, they do not carry out a chief, almost the main idea of the Act, which was the providing of good small houses and surroundings for the artisan in the locality, and so they add to the congestion of such houses in the city. Therefore, those interested in these developments on the committees should have been specially careful not to have made it impracticable for landowners in other districts to provide what they had failed to do.

What is to become of artisans if no one provides them houses? The ratepayers or the taxpayers will have to do so; therefore it is time they began to think more about the practical side of these questions. Development by landowners themselves is the very best kind of development, and should be encouraged rather than discouraged. Many were doing so in East Birmingham, hence the specially good development, as the speculator or middleman's profit was cut out and better amenities provided.

The first committee who refused our excellent plans for houses which I exemplified, in which the sanitary arrangements were as good as modern science can devise, held up the development of one of these estates as an example; but to gain a certain effect they had strained out the gnat and swallowed the camel with a vengeance, for there is a small passage of a few square feet between the outer door and the kitchen through which fresh air should come every time the door is opened; but on one side this passage is the larder, and on the other side the w.c.!

Secondly, I am asked what are the provisions in the East Birmingham scheme which drove builders away? I gave four examples of the unreasonable treatment mentioned in your issue of December 27 in the first column on page 584. I have just given another example in answer to question 1. I am not surprised my interrogator could not believe that such treatment became part of the scheme, and so equal to an Act of Parliament, but it did. Can

* We give special prominence to this article, because it does, to our thinking, emphatically prove that much mischief is likely to be wrought throughout the country if the scheme is to be taken as a "model," as Mr. John Burns suggested; and because we believe the modifications in the present procedure of administering the Town Planning Act are very necessary.—Ed. "B.N."

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it cause astonishment that builders and those who finance them, seeing such treatment possible, cleared out of the area? and in reply to our appeals the Local Government Board thought it sufficient to reply, some must expect to suffer, and it hoped others might benefit. But everybody suffered, and it appears to me that many more in other localities may suffer unduly unless there is an appeal.

Thirdly, it is asked, how could the objections be remedied so that good development could be compatible with Town Planning Regulations? I would suggest an appeal to practical men. Such treatment as I have mentioned could not possibly have happened had there been one sent to conduct the inquiry. They should be Fellows of the Surveyors' Institution, and the procedure should be as expeditious, simple, and cheap as possible. Clear away the cumbersome red tape entanglements of procedure so that attention can be better concentrated on the actual work; and let approved building continue whilst a scheme is being formulated. Make it comparatively easy to amend the scheme. The same ponderous procedure is as necessary, as things are, to amend as to make one. Those who framed the Act must have thought it would rarely be necessary, or even desirable, to amend a scheme! All the Local Government Board inspectors should be Fellows of the Surveyors' Institution and have been used to estate development. It does not even follow that a surveyor who has been trained in a Local Board office is suitable for this work. Such surveyors are more used to criticise, and criticism is quite a different thing from the initiation and development on business lines as a paying proposition. All landowners should be permitted an interview with the inspector, and one inspector is better than two. Another difficulty, and one that is very hard to deal with, is that the committee may, and generally does, consist of amateurs; and, however desirous of doing the right thing, they cannot be expected to see all round the questions at issue at a glance like an expert; and discussion is often necessary, which takes time, during which there may be some fresh members, some of whom may be wedded to special preconceived views of their own, perhaps on side issues, and so the main objective is missed or marred. Some, again, who know a little about the subject seem biassed against the views of experts, others may not have time to go into detail. Is it not rough on landlords to be experimented upon thus? Surely there should be an appeal? This scheme ought to be scrapped, at any rate so far as relates to land that was being satisfactorily developed, if only because landlords were not consulted as specified in the Act.

As to the future working of this scheme, some larger houses may be built on the outskirts, and existing road frontages may be built up, but I cannot imagine that anyone is likely to develop back land under present conditions; and, as I instanced, there was one owner developing about fifty acres at an ultimate cost of about £20,000 in roads, and under covenants to make certain of them. One block of thirty acres has not one foot of old road frontage, and there has not been any application for land for houses thereon for nearly six years. Why should unnecessary difficulties be put in the way of builders, and thousands of artisans with their families kept out of this area, the most important position for houses of that class in the whole city?

Shops may not even be built for accommodation of the inhabitants at the corner of the roads without costly red tape advertisements and delay, the desire of the owner or the consent of the committee not being sufficient.

I sympathised with the Board's desire to reduce the number of houses in one block. They fixed eight, quite reasonably. We very often had six, sometimes less; but I pointed out to the Board they were defeating their own object by making the passages between the blocks 6 ft. wide with these costly road frontages, and suggested reducing the width according to the number of houses in a block. They only made a slight alteration of little practical value.

Another and a difficult point is, that no one may build within 6 ft. of their boundaries. Suppose an estate were put up in small plots for sale by auction; each plot would require 12 ft. additional frontage beyond that actually required for the site of the houses, thus increasing by about two-thirds the cost of land for each pair of houses.

Extra delay takes place in getting plans passed by two authorities. Under by-laws a builder generally knows beforehand what plans will be passed, and the date of approval, and can arrange to commence work accordingly. There is more in this point than appears; but he cannot forecast what a town planning committee will do, or when, and, scared by their tremendous powers, without any possibility of appeal, he will naturally build elsewhere.

Schemes ought, if possible, to apply to the whole of a district, when, if mistakes are made that stop building, the whole town suffers, and so quickly works its own remedy; but in this scheme a few developing landowners in a comparatively small area are most cruelly punished by the experiment, and the owners of land and houses in adjoining districts materially benefit.

Might alone makes the treatment right, and there is no ordinary business way of getting redress. Publicity seems to me the only means, for we are, or have been, up against not only the committees who initiated it, but the present one which did not, the corporation who approved it, and the Local Government Board who over-ruled it all. Parliament had no time to attend to it, the public do not understand it, the working man wonders at it, and the details are not sufficiently interesting for the editors of ordinary newspapers to publish. The man in the street does not trouble himself about it.

Much formality and many difficulties would be overcome if a few practical, well-considered bye-laws, which everyone could understand and every district could adopt, could be formulated, giving a far-reaching and immediate effect throughout the whole district, thus treating everybody alike, often saving the necessity and trouble and loss of time in preparing a scheme, and much reducing this trouble where one was necessary subsequently.

The chairman of the second committee quickly scrapped certain impracticable proposals of the first committee, who had been at work over twelve months. His time, however, was too short, for, most unfortunately, the draft scheme had to be prepared and advertised on June 25, to be in time for the approval of the corporation on July 30, 1912, the last meeting before the Long Vacation, and before the owners had seen it, and therefore they had no opportunity of pointing out the defects; otherwise I have no doubt many objections would have been rectified, and so the owners' requests were handed over to the Local Government Board to deal with, with the result I have endeavoured to describe.

I feel sure Mr. John Burns had no desire that this unfair treatment should have been pursued, for, after his speech at Caxton House, in which he advocated the methods in Birmingham, I wrote to him, and he kindly gave me over an hour's interview, and listened patiently to all I said with an evidently keen desire to get at the bottom of the mystery. He, of course, expressed no opinion, but I am satisfied if I had not impressed him strongly he would have shown me the door within the first five minutes. He promised to consider the matter, but within about a week he was made President of the Board of Trade, and he then wrote me that he could not do anything.

The National Housing and Town Planning Council held a meeting in Birmingham on January 27 and 28, 1915. I had received an invitation to say a few words on town planning, and attended at the end of the first day to arrange the time for doing so on the following day. In a little conversation, it was suggested that my criticisms would be of a friendly nature; I simply replied they would be the truth. The next morning I received a letter suggesting that I should not say anything. Surely, if our development was sufficiently good to be held up as a model at a meeting of the Municipal Engineers at Plymouth in 1910, the wrecking of it was worth a few minutes' consideration by a meeting of the National Council, where delegates were present from all parts of the Kingdom, and ocular demonstration of the excellent development, and the disastrous effect, side by side, of this ill-considered scheme was within three miles. And yet I believe, but I am not quite sure, that the Local Government Board allowed certain expenses for the delegates who attended the meeting.

Experiments must be made, and I appreciate the difficulties in immediately amending a town planning scheme, but it is now over five years since the town planning proposals stopped building within the area. Some eighteen months ago I explained to the chairman of the second committee the unfairness of the scheme, and eventually so convinced him, that he was willing to assist in amending it. I suppose at that time the Local Government Board were not willing; but, recently, on my representations to the new President of the Board, they expressed their willingness to reconsider if requested by the corporation. I now believe they will do so rather than watch the effect of the experiment after the war; for if builders cleared out in a boom before the war, they are sure not to come back after, and it is in the interest of the artisan and everybody concerned that those owners who were developing should be put in such a position that they can continue their building operations as soon as that is possible, although it will be impossible to provide the same accommodation at the same rent again. Masses of red tape entanglement, which have taken about two years to weave, stand, however, in the way; but I submit the matter is of permanent importance for relief to be given under the Defence of the Realm Act; for some 20,000 more hands are now employed in new factories in this area, erected since the war began for war work, than were employed six years ago, when houses were then wanted so badly.

Nearly six years ago, when the excellent plans I described were refused by the first committee, they said they would prepare plans for us to copy; they have been at work at them; I have seen some of them. Recently I asked for a copy. The reply came back they had not yet been able to produce a sufficiently satisfactory plan; yet they refused ours six years ago.

In comparing schemes, the local cost of

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roads should be taken into consideration, and the rates, etc. The ordinary Birmingham road has six inches of ashes, six inches of hand-packed slag, six inches of broken granite, and the gutters and kerb are built with great blocks of granite, six inches thick, twelve inches wide, and in lengths of not less than three feet, upon six inches of cement concrete.

RICHD. FOWLER, F.S.I.
118, Colmore Row, Birmingham.

THE INSTITUTE OF BUILDERS.

At the thirty-third annual meeting of the Institute of Builders, held on March 7, the annual report was presented, and the usual formal proceedings in connection with the election of Council and officers were transacted, the following being elected:—President, Mr. G. Bird Godson; Vice-President, Mr. F. Shingleton; Hon. Treasurer, Mr. F. G. Rice; Hon. Auditors, Messrs. E. M. Sharman and F. Wall. The following were elected to fill vacancies on the Council:—Messrs. F. M. May, R. J. Holliday, H. Willcock, James Storrs, and G. M. Burt.

In the course of the report attention is called to the difficulties under which the business of such an organisation as this has to be carried on at the present time, but, regardless of the innumerable calls made upon its members in other directions, the Council has found time to discuss and dispose of many questions of importance that have presented themselves during the year.

A number of members and sons of members are on active service; some have been honoured with war distinctions, many have been seriously wounded, and some have made the supreme sacrifice.

The important question of apprenticeship and technical education has been carried a considerable step forward. As the result of conferences between the London (Central) Advisory Committee for Juvenile Employment and representatives of the employers and trade unions of the building trade, a scheme, originally drafted by this Institute, was discussed, with the result that a scheme of apprentice training has been evolved, which, it is hoped, will be adopted for London, and form a model, from which other schemes may be adapted, suitable for the various provincial districts, seeing that the National Federation of Building Trades Employers has approved it.

The Council has in many ways endeavoured to encourage boys to choose the building industry as their future life-work and means of livelihood.

Negotiations for a form of sub-contract, for the use of builders with their own sub-contractors, have been carried on during the year by a joint committee, representing this Institute, the National Federation of Building Trades Employers, and the Confederated National Association of Master Plasterers, Plumbers, and Slaters, resulting in an agreed document, which will shortly be submitted to the respective main bodies concerned, with a view to its approval and adoption by them.

The Council, looking to the future, has taken up the question of organisation, with a view to enlarging the scope and usefulness of the Institute, and substantial progress has been made in the preparation of a scheme, the object being to raise the standard of technical qualification required in the industry, and so improve the status of those engaged therein.

The Council has been fully alive to the serious condition of affairs brought about by the restrictions imposed upon building work by the orders of the Government, and has co-operated with other bodies in making representations thereon.

There is a change to record in the secretaryship of the Institute, Mr. Costigan, who has for many years occupied that office, having retired for reasons of health, the Council has appointed Mr. A. G. White, of Pen Corner House, Kingsway, London, W.C.2, to succeed him, to whom in future communications should be sent.

Our Illustrations.

THE CAMERA FROM BRASENOSE COLLEGE QUAD., AND "THE HIGH" FROM TOP OF THE MAGDALEN TOWER, OXFORD.

These beautiful pencil drawings are by Mr. Fred Richards, A.R.E., A.R.C.A., who, on previous occasions, has kindly lent us some of his architectural work delineated and finished on the spot with a three B-pencil. We intend shortly to give two similar views drawn by him in Rome. Mr. Richards, in both cases, has taken a bird's-eye view from a notable standpoint, and then chosen one of the leading outstanding features in the landscape composition and illustrated it by an accompanying detailed drawing placed alongside the comprehensive picture. Of the two Oxford studies given to-day the artist has sent us an extract from an unpublished description intended for a work the publication of which he is contemplating:—"The city of spires is a veritable paradise for the young architect. In the choice of subjects the only difficulty is in the selection. They are legion. The man is yet unborn who would dare to give pride of place to any one particular college in the presence of an Oxford man, unless it be his own. Each college boasts its own particular beauty or historic consequence. For those who can claim Oxford as their Alma Mater the place is never effaced. On a sunny day Oxford knows no rival. The Magdalen Cloisters and Open-Air Pulpit Corner, New College, Tom Tower, Brasenose Quadrangle, The Camera, The Broad Walk in Spring, the sundial of Corpus Christi, the view from the meadows, the Sheldonian Theatre, and many more are names to conjure with. What must Oxford have been before the hands of ruthless and ill-advised restorers were laid on it?" William Morris wrote:—"There are many places in England where a young man may get as good book-learning as in Oxford, but none where he can receive the education which the loveliness of the grey city used to give." Much of the old beauty remains, however, and Mr. Richards' sketch of "The High" gives an excellent idea of the poetic charm of the city viewed from the summit of this great college belfry. Magdalen College was founded in 1468, and here many sons of Royal lineage have received their education, including the present Prince of Wales. "The High" itself has been described as the finest sweep of street architecture in Europe. On the right is Queen's College, beyond that All Souls, the spire of St. Mary's coming further still in the view, with the early 18th century Græco-Gothic tower of All Saints' Church in the distance. This belfry is one of the most successful attempts of its kind existing in England. On the other side of the thoroughfare stands University College; also nigh are the "new schools," by Sir T. G. Jackson, Bart., R.A. In the second drawing the cupola of "The Camera," viewed from the quadrangle of Brasenose, presents a strikingly bold masterpiece in contradistinction from the general architecture of "The High." This handsome rotunda was designed by James Gibbs (1737-1747) for Dr. Radcliffe, the physician of William III. and Queen Anne. He left £40,000 for its completion. The cupola is 100 ft. in diameter, and has a height of 142 ft. to the finial. We gave a double-page illustration of the Radcliffe Library sketched from the S.W., by the Royal Academy Gold Medallist, Mr. Leslie Wilkinson, in the BUILDING NEWS for March 29, 1907. On plan the sub-structure is sixteen-sided, and it is one of the most satisfactory and most clever classical buildings in Oxford University. The inner wall which carries the oak-framed dome is 56 ft. in diameter. The noble domed hall, measuring 46 ft. high from the floor, is used as a reading room for the Bodleian Library, which Sir Thomas Bodley bestowed upon Oxford, and for which he erected a suitable building finished in 1602. Having a claim upon a copy of every book published in this country, the Bodleian Library has long outgrown the capacity of its original storage space, hence its subsequent combination with "the Radcliffe," and the so-called "Camera" is often termed "the Bodleian," hence some local confusion of designation. Brasenose received its cognominal from the famous knocker distinguished by a brazen nose of large proportions which was originally fixed over the old college gate. The community of Brasenose migrated in 1333 to Stamford, carrying with them their door-knocker. They were, however, compelled to return to Oxford, and in hurrying back to their Alma Mater the heraldic leopard-head, with its drop-ring knocker in its mouth, somehow or other was left at Stamford. For 500 years afterwards it was missing, and not till the present college purchased the Brasenose property at Stamford was the knocker restored to its original home, where it is now treasured and preserved.

QUEEN'S HOUSE, NOW FINISHING IN KINGSWAY AND LINCOLN'S INN FIELDS, LONDON, W.C.

This detail of the main front towards Kingsway is given in further illustration as promised when we published the general elevations and plans of these premises in the BUILDING NEWS for February 14 last, with a descriptive note and a through section from Kingsway to Lincoln's Inn Fields. Mr. M. E. Collins, F.R.I.B.A., of Old Broad Street, E.C., is the architect, and Mr. C. Grey, of Shepherd's Bush, is the builder and general contractor. The heating and hot water service is designed on the central system, and has been carried out by Messrs. Haywards, Limited, Union Street, Borough, S.E. The heating is by low-pressure hot-water, and is a combined gravity and accelerated service, so arranged that by the accelerator (motor driven) rapid circulation is obtained for quickly raising the heat, and a higher efficiency for obtaining even distribution of circulation to all parts of the building. The radiators are of a special pattern, and so constructed that either the internal air can be warmed, or the outside air, before entering the building. The hot-water service is generated from a calorifier, and is superheated from the heating boilers, thus obviating any trouble in regard to furring of pipes, etc. The various offices of the building are ventilated by the "natural system," fresh air being brought in through the radiators and used air extracted by Louvred ventilators, set in flues running independently to summit of the building. The whole of the work has been installed to the designs and under the supervision of Mr. Adrian Collins, consulting engineer, 61, Old Broad Street, E.C.

HOTEL DE LA CIE GENERALE TRANSATLANTIQUE, RUE AUBER, AND LA NATIONALE ASSURANCE OFFICES PARIS.

To-day we give some further photographs of typical works carried out by the R.I.B.A. Royal Gold Medallist for 1917, M. Hénri Paul Nénot, Member of the Institute of France, They are the new offices of the National Assurance Company and the Hotel of the Générale Transatlantique Company, Rue Auber, Paris. The new Sorbonne buildings were illustrated by us on March 7, following up our notice of M. Nénot's life and work, given with his portrait, in the BUILDING NEWS on February 28. Two other of his buildings will be found illustrated in our issue of March 21 last.

The Newton Abbot R.D.C. have granted a war bonus to Messrs. J. A. Phillips and S. Olver, their road surveyors.

Mr. Middleton Turnbull, surveyor and inspector for the Shildon Urban Council, has accepted an appointment under the Road Board for road-making in France.

The death occurred at Blyth on March 27 of Mr. Emanuel Kelsey, the veteran captain of the Blyth Volunteer Life Saving Brigade. Mr. Kelsey was one of the oldest members and held the Board of Trade Medal for long service. He was a plumber by business.

The death is announced, on March 26, at "Medrose Cottage," Penzance, Cornwall, England, of Olive Minna, widow of Edward Skinner, F.R.I.B.A., of Colombo, Ceylon, and Inverurie, Scotland, and daughter of Mr. and Mrs. Alfred Martin, of "Medrose Cottage," Penzance, aged 35.

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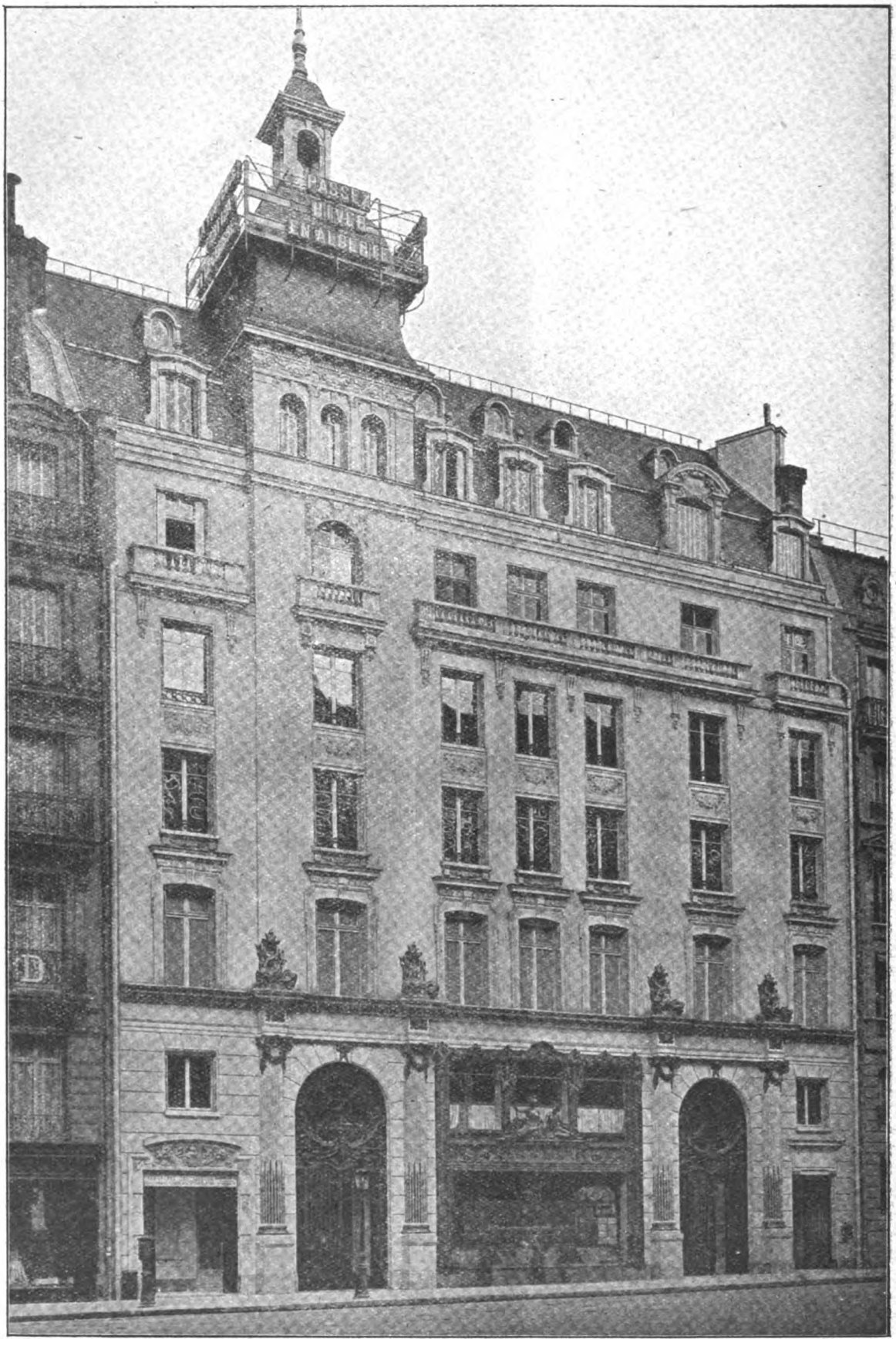

HOTEL DE LA CIE GENERALE TRANSATLANTIQUE, RUE AUBER, PARIS.
M. Hénri Paul Nénot, R.I.B.A., Royal Gold Medallist 1917, Architect.

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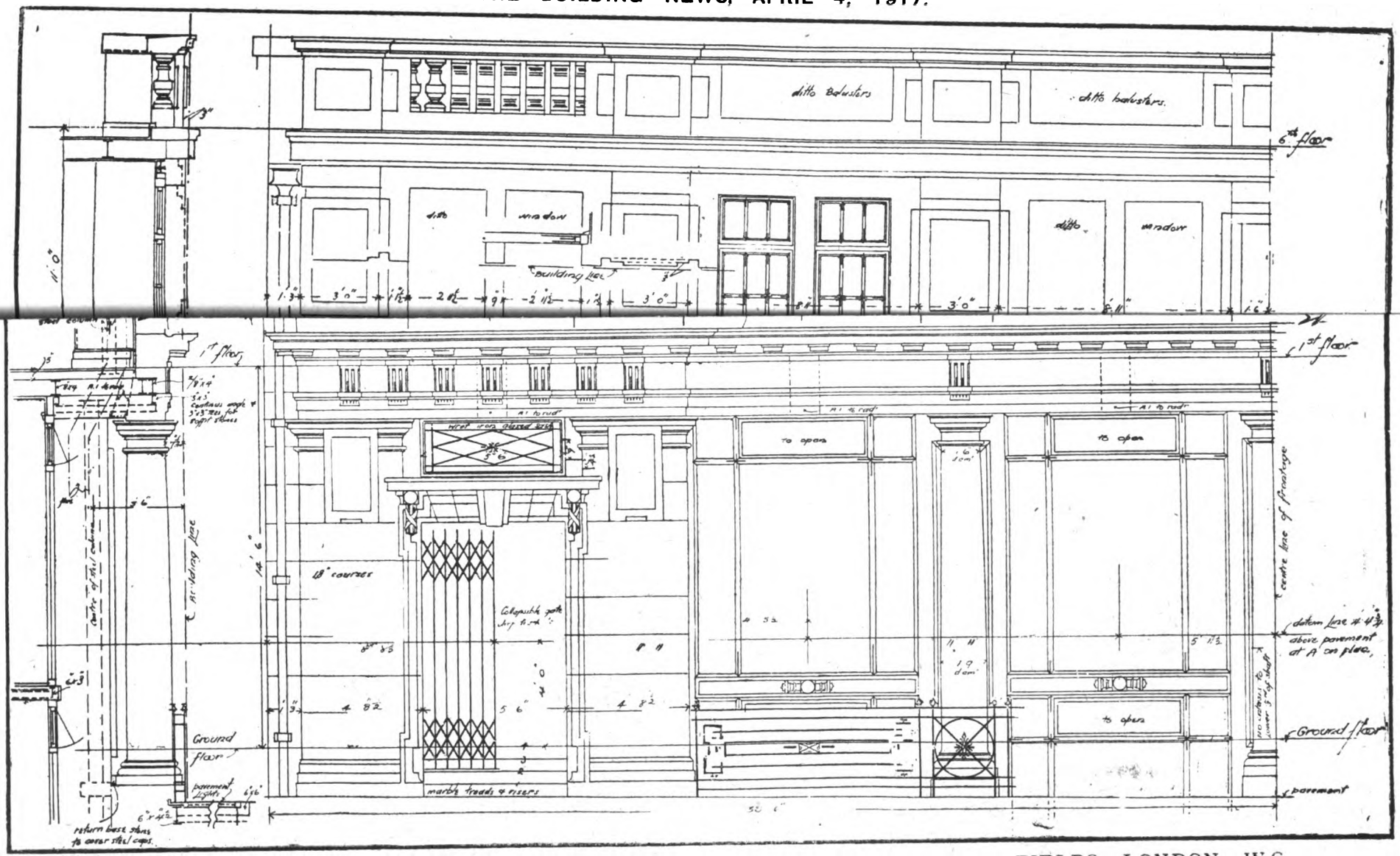

QUEEN'S HOUSE, NOW FINISHING, IN KINGSWAY AND LINCOLN'S INN FIELDS, LONDON, W.C.
DETAILS OF THE KINGSWAY FRONT.—Mr. M. E. Collins, F.R.I.B.A., Architect.

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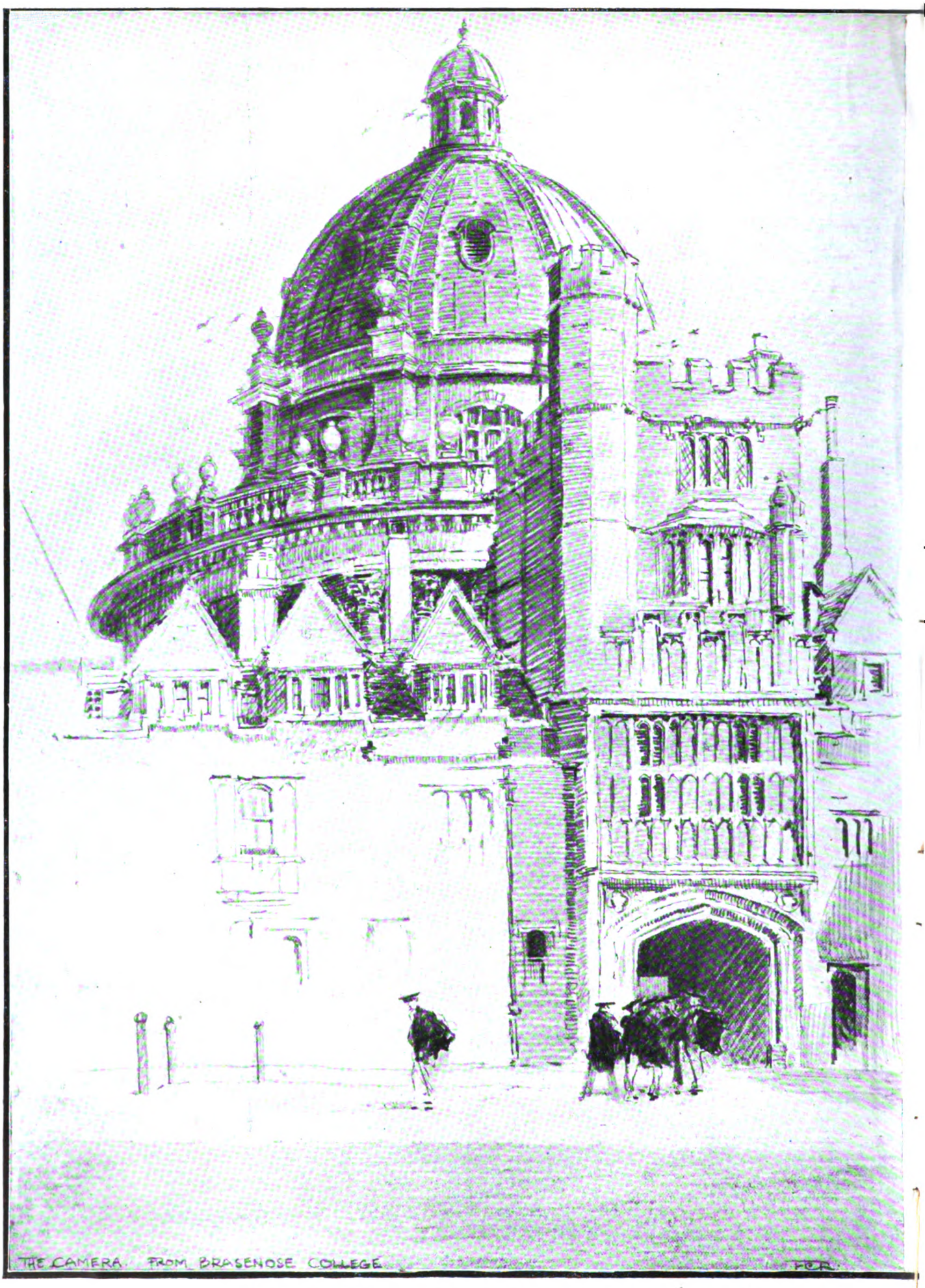

THE CAMERA, FROM BRASENOSE COLLEGE, AND VIEW OF "
From Pencil Drawings by Mr. H

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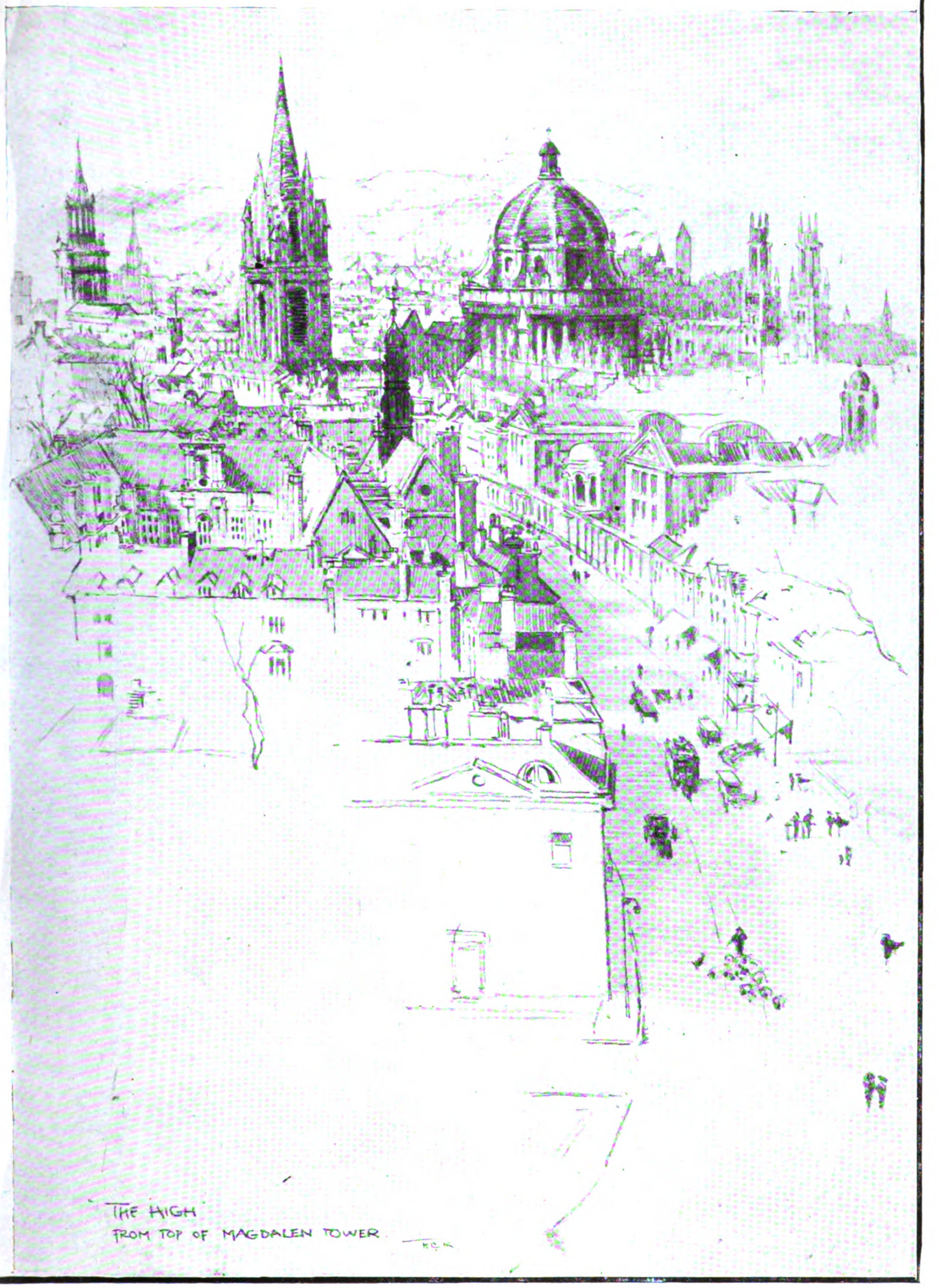

'HE HIGH," OXFORD, FROM TOP OF THE MAGDALEN TOWER.
RED RICHARDS, A.R.E., A.R.C.A.

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LA NATIONALE ASSURANCE OFFICES, PARIS.
M. HÉNRI PAUL NÉNOT, R.I.B.A., Royal Gold Medallist 1917, Architect.

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THE FUNDAMENTAL PRINCIPLES OF GOOD LIGHTING.*

By P. G. NUTTING, Ph.D., Director, Research Laboratory, Westinghouse Electric and Manufacturing Company.

The historical side of the subject of good lighting is extremely brief. Artificial lighting is as old as the human race, but from the most ancient times until quite recently the one principle of lighting seems to have been the elemental one of a bare sufficiency of light. Only the simpler requirements of vision were recognised, efficiency in lighting was apparently not considered at all.

We are at present in a transition stage. The lighting industries paved the way for a great advance in lighting methods by making available an abundance of light. This means in effect that practically any desired *quantity* and *quality* of light are at our command. Further, the variety of lighting fixtures is an assurance that any desired *direction* and *ratio* of *scattered* to direct light may be had. Photometry is able to supply us with any desired data on intensity, brightness, and distribution. Clearly, then, the time is ripe for the research engineer to determine what lighting is most desirable. He cannot be expected to draw up a general scheme of lighting any more than a bridge engineer may produce a general plan for all bridges, but general principles may be determined and laid down for the guidance of illuminating engineers.

Good lighting is that which produces good seeing. This simple definition is both broad and precise; that lighting may be good, it is both necessary and sufficient that it produce good seeing conditions. The fundamental principles of lighting must, therefore, be derived from the requirements of vision, and these, in turn, from the laws governing the sensation caused by any given exposure of the retina to light of any given flux density and density distribution. In other words, the passage of light from a source to a reflecting object, and thence to the eye and retina, is all governed by simple optical laws. Nothing occurring during that passage determines whether the seeing is good or bad—seeing conditions quite satisfactory to one eye might be quite intolerable to another. But the psychophysical relations between the light entering the retina and the sensation produced are all important.

The following table may, perhaps, clear up the rather complex relation between lighting and seeing.

I. GOOD SEEING.
Discrimination—Contrast in detail.
Acuity—Sharpness of detail.
Efficiency—Seeing: Fatigue. Light economy.
Comfort—Lack of fatigue. Lack of injury.
(Related by Psychophysical Laws to.)

II. RETINAL FLUX of Light
Intensity *Distribution* *Colour*
(Deducible by Optical Laws from).

III. Objective BRIGHTNESS and CONTRAST
(Deducible by Optical Laws from).

IV. ILLUMINATION and REFLECTING POWER of Objects
(Deducible by Optical Laws from).

V. INTENSITY and POSITION of Light Sources.

This bald outline of the principles of illuminating engineering emphasises the importance of those psychophysical relations between light flux (in, say, lumens per square millimetre) at the retina and the corresponding perceptions. It indicates why good lighting cannot be defined in terms of illumination and reflecting power of objects illuminated, nor yet in terms of brightness and contrast in the field viewed. Retinal flux of light, even, is not sufficient to insure good seeing—the lighting must be such as to give the desired discrimination, acuity, efficiency, and visual comfort, and a specification in terms of even retinal flux would fail to take account of the entire visual factor. Under certain conditions an increase in brightness and clearness may be obtained by actually *decreasing* the illumination.

Good lighting, then, is that which produces good seeing conditions, and good seeing is that which enables the average normal human eye to best distinguish details, in high-light, half-tone and shadow, with at least moderate visual efficiency and comfort. Some vision under difficult seeing conditions is by no means objectionable, in my opinion, since over-protection is a sure cause of deterioration.

Now the ability of the eye to distinguish detail is not a fixed constant nor yet is it a function of a single variable, as in the corresponding case of the photographic surface; it depends upon (1) the absolute brightness of the object viewed, (2) upon the brightness or darkness of its surroundings (*i.e.*, upon peripheral vision), and (3) upon the brightness of objects just previously viewed (adaptation). Let us consider each of these relations in turn, concluding with some practical applications of the principles and data discussed.

VISION WITH STEADY, NEARLY UNIFORM, FIELD BRIGHTNESS.

It is commonly known that the eye automatically adjusts its sensibility to the general brightness of the field viewed. Over a wide range of moderate intensities we are able to distinguish slight differences in light and shade about equally well. At lower brightness levels and at very high, considerably larger differences are the least that can be distinguished, while near the lowest perceptible intensities we can see but mere outlines. The whole range of intensities over which the eye operates, from the threshold of vision up to the blinding brightness which is the upper limit of adaptation, is roughly ten billion (10^{10}) to one, from 0.000001 millilambert at the threshold up to 10 lamberts. The latter brightness is about that of a sheet of white paper under direct normal sunshine. The clear noon sky, the full moon, and a gas flame are each about one lambert in brightness; the lower limit for comfortably reading ordinary print is about 0.01 millilambert. Visual sensibility itself varies by a factor of about 10^7 while the field viewed varies by 10^{10}.

At any given general level of brightness, say that indoors under artificial lighting (about 1/10 m.l.), three visual constants are of chief interest: the lowest perceptible brightness, the least perceptible difference in brightness, and the highest tolerable brightness. These constants are a measure of what we can see and of how well we can see at that brightness level.

Threshold Sensibility.—To obtain the lower limit of vision we first view a large white surface of known brightness until thoroughly adapted, then suddenly drop this brightness to another very much lower which is just visible. This threshold, of course, varies enormously with the brightness of the field to which the eye is initially adapted.

Discrimination.—Distinguishing slight differences in light and shade, picking up detail, is the characteristic function of the eye. This depends somewhat upon sharpness of definition and largely upon differences in colour, but is principally a matter of contrast in brightness. Contrasts are ordinarily due either to differences in reflecting power or to partial shadows. Vision is best when contrasts are about 10 to 1, but is entirely comfortable with contrasts as low as 51 : 50 or as high as 20 : 1. Where contrasts are as high as 100 : 1, vision is not as acute and far less efficient than when they are moderate.

The relative efficiency of the eye under various contrasts and brightnesses is doubtless roughly measurable by accuracy and fatigue methods, but the fundamental datum in this field is the difference sensibility, resolving power for light and shade, discrimination, or whatever it be named. This datum is readily obtainable by photometric methods. It is the ratio (inverse) of the just perceptible difference in brightness to the brightness at which it is measured, B/dB. This is simply the reciprocal of the photometric difference determined twenty years ago by König and since then by numerous other observers. This curve of just perceptible difference has the general form of a sled runner. Recent work has but confirmed its general shape, established it in definite brightness units and determined the effect of time or adaptation.

These curves may be compared with the corresponding reaction and discrimination curves for a photographic plate, a Seed 30, for example. The inclined curve is density of negative plotted against logarithm of exposure, the other is its derivative, the difference sensibility of the plate. The slopes are much steeper and more symmetrical than in the case of the retina, while the region of normal exposure is just about as extensive. The general similarity of the visual and photographic curves is very striking, and indicates a similarity in the photochemical processes involved. The fact that the eye reaction is a function chiefly of intensity, while the photographic is a function of total energy (intensity × time), is doubtless due to restoring forces in the retina that are lacking in the photographic emulsion. The length of the initial slope of the eye curve indicates a distinctive initial phase of the reaction.

Glare Sensibility.—For any eye, adapted to any given brightness level, there is another much higher brightness just painfully bright, in which moderately contrasty detail cannot be distinguished. It would appear that only the roughest measurements of the glare limit would be possible, but since this datum is of the greatest importance to illuminating engineers, a determination was attempted. The three observers obtained quite concordant results, the mean showing a linear relation between log glare and log field brightness.

The illuminating engineer is chiefly concerned with four quite distinct brightness levels, namely :—

0.001	m.l.	(E.N.) Exteriors at night, street lighting.
0.01	m.l.	(I.N.) Interiors at night, interior artificial lighting.
1.0	m.l.	(I.D.) Interior daylight lighting.
1.0	l.	(E.D.) Exterior full daylight lighting.

VISION IN CONTRASTY FIELDS.

The data just given refer to vision with surroundings of nearly the same brightness as the object directly viewed. When this peripheral field is much brighter or darker than the centre, vision is seriously affected. In other words, central retinal sensibility depends upon the total light striking the retina and its distribution, as well as upon the light striking the fovea. Seeing in one eye is even slightly affected by the condition of the other.

A simple experiment with a tube shows the magnitude of the peripheral effect. If we view a blank space steadily through a black-lined tube 3 or 4 centimetres in diameter and, say, 50 centimetres long, held close to the eye, the spot seen through the tube grows rapidly in brightness until at the end of about a minute it appears 50 to 100 times as bright as the same spot seen with the unshielded eye. The light flux on the fovea is the same for both eyes. If the general level of brightness is low, this increase in apparent brightness is accompanied by a heightened discrimination, showing that the retinal sensibility is actually shifted along the discrimination curve by the shielding.

The opposite effect, with surroundings brighter than the centre of view, may also be demonstrated, but requires laboratory apparatus. Both kinds of non-uniform field lead to visual discomfort, both in extreme cases cause a sensation of glare. Ives' investigation of photometric sensibility showed that the maximum of sensibility is obtained with nearly uniform brightness of the whole field of view. Glare we know to be impossible in nearly uniform fields throughout the whole range of intensities to which the eye is capable of adapting itself.

We have obtained precise data on the depression of sensibility under various conditions of the surrounding field. Having the surrounding field dark and varying the angular size of the light central spot give curious results. If the central spot is not very bright, diminishing its size decreases the sensibility, while if it is quite bright the reverse is true. At intermediate bright-

*Presented at a meeting of the Section of Physics and Chemistry of the Franklin Institute.

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nesses, varying the size of the central spot does not affect the sensibility.

EFFECT OF SIZE AND BRIGHTNESS OF SPOT ON SENSIBILITY.

Solid Angle of Bright Spots.	Field Brightness 1.0 m. l.	17 m. l.	170 m. l.	600 m. l.
Full	0.0064	0.074	0.29	1.2
1.0	0.0050	0.074	0.27	1.4
0.1	0.0065	0.074	0.26	1.5
0.01	0.0090	0.074	0.22	1.5
0.001	0.0125	0.074	0.13	0.84
0.0001	0.0161	0.074	0.08	0.15

The effect is most pronounced at small solid angles.

Aside from its angular size and brightness, the effect of a glare spot on sensibility depends upon its position relative to the axis of vision. Data on relative threshold are given below for a field brightness of 0.1 m.l. and a frosted lamp about 1 lambert in brightness.

Angle	0°	10°	20°	30°	40°
Relative Threshold	0.11	0.17	0.26	0.42	0.65

The (logarithmic) depression of foveal sensibility is a linear function of the angle with the axis. Beyond 50° no depression was perceptible.

The ocular discomfort caused by a lamp flame or filament within the field of view is largely a matter of intrinsic brilliancy and is relieved by a diffusing shade. The depression of sensibility, on the contrary, is a matter of total candle power and is not relieved by a shade which merely diffuses the light. If the brightness is held constant and the area (*i.e.*, total candle power) varied, then the depression varies as the square root of the candle power or area.

ADAPTATION TO VARYING BRIGHTNESS.

Vision is practically as comfortable and acute at the mean brightness of a well-lighted interior (0.1 m.l.) as in full daylight with a mean brightness level ten thousand times as high (1 lambert). The visual mechanism automatically adapts itself to the changed conditions by some means not well understood. If the brightness level is suddenly changed, adaptation is very rapid at first, then comes gradually to equilibrium.

The following table shows roughly the rates of increase and decrease in sensibility in an ordinary case. The data refer to the change from complete darkness to a brightness of 25 m.l and vice versa. Twenty-five millilamberts is about the brightness of a sheet of paper in a well-lighted room on a bright day. It is a brightness quite blinding to an eye adapted to darkness, yet but a thousandth as bright as the average automobile headlight.

In the experiment the eye was sensitised to one level of brightness (0 or 25 m.l.) then suddenly exposed to the other and the (threshold) sensibility determined at intervals by the test spot method described above

RATES OF INCREASE AND DECREASE OF SENSIBILITY.

Time.	B = 0, B = 25 m.l. Sensibility Decrease.	B = 25 m.l., B = 0 Increase.
1 second	2.1 times	1 6 times
2 seconds	4.2 ,,	2.6 ,,
5 seconds	16.2 ,,	7.6 ,,
10 seconds	58.0 ,,	14.4 ,,
10 minutes	120.0 ,,	20.9 ,,

For example, if an eye adapted to darkness be suddenly exposed to 25 m.l. its sensibility drops to 1-16 in 5 seconds, and a subsequent rest of 10 seconds will by no means restore its sensibility. A great deal more data of this nature is desirable.

Dark adaptation has been quite thoroughly investigated. Starting with the eye sensitised to a given level of brightness, the light is suddenly removed, and the rate of growth of sensibility is noted. This rate of growth varies with (1) the intitial state of adaptation, (2) the colour of the light used, and (3) the contract used in the test spot. It varies also, to some extent, with the individual, his previous states of adaptation, extending back several hours, with the degree of attention exercised, and other similar causes, but the first mentioned variables are by far the most important in practical problems.

The initial adaptation is to some extent counteracted by the opening of the pupil. Precise shutter-test measurements on the rate of pupil opening have yet to be made, but from adaptation curves run with and without a fixed artificial pupil we know that the greater part of the change in diameter occurs in the first half second. The pupil diameter corresponding to each steady field brightness has been determined as given in the following table. Both ends are, of course, horizontal, since the pupil reaches definite maximum and minimum diameters :—

Field brightness	.0001	.001	.01	.01	1.0	10	100	1000
Diameter of Pupil (mm.)	6.1	5.9	5.7	5.4	4.7	3.7	2.8	2.1

Starting with the same initial sensibility, but different colours, red adapts least and most slowly, yellow next, then white, green and blue. Blue sensibility increases twice as rapidly as red and proceeds twice as far.

Most interesting from a practical standpoint are adaptation curves run with certain definite contrasts in the test spot. A strip of neutral grey film of known opacity is laid across the test spot, and the time noted at which it just becomes visible over a spot whose brightness is constantly regulated. We thus obtain an adaptation curve for each degree of contrast. With contrasts so slight as 97 : 100 (3 per cent. absorption in the contrast strip) there is hardly any gain in visibility, while heavier contrasts increase more and more in a given time.

On entering a dimly-lighted room from one brightly lighted, the heavier contrasts first become visible, then the more moderate contrasts. The faintest contrasts fail to become perceptible, even after a long wait. Out-of-doors, at night, not only detail in shadows, but any detail involving weak contrasts is not perceptible.

If we take a vertical cross-section (at 10 seconds, say) of a group of contrast-adaptation curves, there is obtained a relation between just perceptible contrast and brightness at constant time of adaptation. This is the Fechner fraction again; photometric sensibility curves have actually been obtained in this manner.

APPLICATIONS TO PRACTICAL LIGHTING.

The objective of all lighting is to secure visibility of detail in those objects to which attention is directed. The detail to be observed may be : (a) mere outlines of large objects, such as are required in riding along a country road at night; (b) the outlines of small objects, as in reading; or (c) the minutest detail which the eye is capable of resolving. As examples of Class C may be mentioned photo-engraving, drafting, sewing, and many other arts and crafts, where critical judgment is required.

For seeing of Class A but little illumination is required. The light of a high full moon, supplemented, perhaps, by a little local lighting, is ample, if not ideal. Operating so near the threshold, the retina is incapable of rendering detail except with harsh contrasts. Little attention need be paid to the direction of the lighting or to the ratio of specular to diffuse light, since the eye is operating at low efficiency anyway. Spot glare should be carefully avoided, however, since the retina is in a supersensitive condition, and but a little glare will so depress sensibility as to render objects invisible. Ordinary automobile headlights and lighting units visible at less than 30° from the horizontal should be carefully avoided.

Seeing of Class B represents the vast majority of ordinary working conditions, reading, writing, and accounting coming under this class, as does the lighting of school-rooms, auditoriums, and shops. Contrasts are ample, the observation of fine detail is not required. Careless lighting is only too tolerable, and therefore really efficient lighting none too common.

The specification of a discrimination factor of not less than half the maximum is, perhaps, reasonable for this class of seeing. It follows that any illumination that will produce a brightness level of not less than 0.1 m.l., nor over 7,000 m.l., is tolerable, although brightnesses ranging from 1 to 250 m.l. are to be chosen.

The really difficult problems in this class of lighting are providing the proper ratio of direct to diffuse light and giving both the proper direction. Comfortable, acute vision requires that there be neither extreme high lights nor dense shadows within the field of vision, and that the details to be observed present sufficient, but not too great contrast, that is, contrasts of over 50 : 49 and under 50 : 1. Indirect lighting will get rid of the shadows and extremely high lights, but almost completely suppresses contrasts, particularly on glossy or uneven surfaces. Glossy surfaces it covers with a light veil of specularly reflected light, uneven surfaces becoming less visible by suppression of shadows.

With bright daylight in the open, the scattered light from the sky contributes from about 16 to about 40 per cent. of the total light falling on a horizontal or vertical surface. On cloudy days nearly all the light has 180 degrees diffusion, and on clear days shadows are lighted chiefly by skylight. The golden mean for good average seeing is probably not far from 30 per cent. diffused light.

If we view a landscape on an ordinary clear day through yellow, amber, or green glass, the view will appear very much brighter and more clean cut. The old explanation was that the yellow glass cuts out the purple haze, but it does a great deal more than that—it eliminates the diffuse skylight in all shadows, because these shadows are lighted by blue light, leaving the directly reflected sunlight almost unaffected, because the blue in it is but a small part of its total luminosity. The consequence is that shadows are deepened and contrasts everywhere increased, producing a brightening effect. Viewing through blue glass has precisely the opposite effect.

While cutting down brightness with an absorbing yellow glass may produce the appearance of enhanced brightness, added light may produce the sensation of lowered brightness. If a room lighted by high, well-placed direct lighting units be further lighted by a little highly-diffused illumination, the sensation produced is one of a lowered brightness, due to increased brightness of shadows and general decrease in contrasts. In the black tube experiment, shielding the peripheral retina from light produced a sensation of increased brightness fifty to one hundredfold on the unshielded portion, although the total light entering the eye was much less.

The proper proportion of direct to scattered light is readily obtainable in either artificial or daylight lighting. The lighting units must further be disposed so as to give a direction adapted to the service to be rendered. In art galleries the glossy surfaces to be viewed are plane and nearly vertical, hence high-angle lighting is indicated. In machine shops, the glossy surfaces to be considered are largely horizontal cylinders, and the lighting may well be of low angle and very diffuse.

In street lighting there exists a very persistent custom of leaving the illuminant in full view, and of allowing a large fraction of the light to escape upward. A bright illuminant within the range of vision is a powerful depressant of visual sensibility, particularly if near the axis of vision, so that the customary arrangement is hardly conducive to visual efficiency. In interiors both very good and very poor lighting are common in both daylight and artificial lighting.

In the highest class of lighting (Class C, above), where the minutest detail is to be critically observed, only the very best lighting conditions will prevent visual discomfort and eye strain. Fine needle work requires, perhaps, as high class lighting as any. Interest centres upon a mass of fine, bright images, formed by the needle and fibres of textile goods. If all the light is diffuse these images broaden and merge, and shadows disappear. Vision is strained by the attempt to pick up faint contrasts just at the limit of the power of discrimination. The most suitable lighting is that limited to nearly a single direction, and that quite elevated. What is seen is a mass of cylindrical images of the source, and if the source

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subtends but a small angle these images are sharp and contrasty.

In short, the very best seeing requires an abundance of nearly unidirectional light. The light from the sky through high, well-spaced windows, is very nearly ideal. Indirect lighting from numerous sources is very bad. Semi-direct lighting with units closely assembled and at one side is probably the best form of artificial lighting. No part of any lighting unit within the range of vision should exceed 250 millilamberts in brightness, nor should contrasts ordinarily visible exceed 100 : 1.

Our whole discussion has been an attempt to elucidate the principles of efficient lighting, efficient in the double sense of making the best possible use of the light, and efficient in enabling the eye to operate under the most favourable conditions. Extremists have, on the one hand, tolerated any lighting that did not cause permanent injury to the eyes, and on the other have raised trivial objections to even minor causes of discomfort. I have no sympathy with either view; what should be done, in my opinion, and what is worth our best consideration and effort, is the relief of our overworked and much-abused eyes from the wear and tear of the bad lighting conditions which we have ourselves put upon them. It would be unwise and unnecessary to relieve them of all discomfort at all times—that would surely result in a deterioration of the adaptibility of the eye itself. Our standard, in my opinion, should be the comfort of out-of-doors daylight lighting; abundant light 30 per cent. diffused, and—by far the most important—but moderate contrasts anywhere. Under but tolerable lighting conditions the eye is wonderfully adaptable and efficient, and it is to be hoped that within the near future it will be relieved of the many trying conditions under which it is now called upon to operate.

TOWN PLANNING IN INDIA.

PROGRESS IN SPITE OF DIFFICULTIES.

At the last meeting of the Town Planning Institute, Mr. H. V. Lanchester, who has been engaged in India in connection with town planning, gave an address on "Town Planning in Southern India."

Mr. Lanchester described the lay-out of some of the cities, and alluded to the special problems, as, for instance, caste, which have to be specially borne in mind when dealing with housing in India. In a reference to cantonments, Mr. Lanchester gave an insight into the system of local government in vogue.

In the more important provincial towns the civil government of the districts was under a Commissioner, who was responsible for the maintenance of order, for the collection of revenue, and numerous other affairs of importance. There were other officers to deal with irrigation, forestry, police, education, etc., belonging to the respective departments charged with these matters. These officials were at present mainly British, and if they added other Europeans connected with the churches, education, and commerce, it would be seen that there was quite a considerable European colony.

This colony always occupied a suburb of its own, quite distinct from the town, and quite different in character. It was generally loosely and somewhat carelessly laid out, sites having been taken up from time to time according to the taste of the official requiring a house, and subsequently linked up. Every European liked to isolate himself in a large compound so as to secure privacy from his neighbour, or, rather, from his neighbour's servants; everyone drove, so distance was of little consequence (the cantonment often covered a larger area than the town), but such large compounds were far too extensive for cultivation as gardens; at their best they simulated a park, at their worst a desert.

The European pinned his faith to the cantonment because its open lay-out and scattered houses secured it against epidemics and against noise and other drawbacks. It had few other merits, though there was no reason why it should not have been properly laid out at the start, and even now some were not past redemption. The main defect was that no attempt had been made to group or organise the more important or prominent buildings, so that they might form a centre or key to the rest of the lay-out. They were just dropped down in any vacant place, with no more thought than if they were merely an additional bungalow.

The Indian was so accustomed to the authorities taking the initiative that in many cases town extensions were being undertaken by the municipality under Government control and advice, while at the same time a good deal of pressure could be brought to bear on private enterprises. On the other hand, by-laws were loosely drawn up and interpreted, and were very difficult to get enforced owing to the meagre recognition of their duties among the newly formed corporations. Encroachments on public roads had been tolerated for so long that those needing more room regarded it as rather a hardship if they could not filch a strip from the road, especially if their neighbours had already done so a few years back.

In dealing with housing problems consideration had to be paid to the epidemics of plague that so seriously affected the welfare and prosperity of many Indian towns and villages. The measures necessary to combat these were now generally understood. In short, the carrier of the plague germ had been proved to be the rat flea, and measures discouraging harbourage for rats diminished plague.

Building in soft material such as earth, buildings closely packed, and unprotected grain and other stores ought to be abandoned as far as possible. Earth or mud buildings where unavoidable on economic grounds should have stone or brick foundations, and wire netting protection carried through the base of the walls. Still more important was it that such houses should be isolated from each other or only permitted in small groups. The plague camps had proved the advantages of isolation and had done much to encourage building in India on a more open system than was formerly customary, the relative immunity of detached houses had given great encouragement to development on lines akin to those of the garden suburb in Europe, and it only remained to organise the extensions of affected places on these lines to produce a very great amelioration.

To put it broadly, all buildings closely packed should be of hard material and well constructed. Kutcha buildings must be more or less isolated with good open spaces between each block. This might appear to involve very drastic procedure, but when the annual loss of life and well-being was taken into consideration, it would be realised that if they kept these aims in view in their improvement schemes they might reasonably expect to get control over this terrible epidemic.

THE HOUSE FAMINE.

At a recent meeting of the Prenton Literary Society, Mr. R. Rowland Hughes, a well-known Birkenhead estate agent, delivered an interesting address on housing and town planning, discussing the position as it is to-day and making various suggestions as to how it should be met. The lecture attracted such a great amount of attention that the society decided to have it published and forwarded to certain authorities throughout the country. It is to be issued shortly.

Dealing with the house famine, Mr. Hughes says the resultant conditions of overcrowding are tending to neutralise much of the good work accomplished by legislation during the past twenty years. Many people were content with the explanation that the war was responsible for the cessation of building operations, but those familiar with the trend of events during the past few years were satisfied that, had there been no war, the results would have been the same. For this state of affairs Mr. Hughes—who makes it clear that he does not speak from a political point of view—blames the land clauses in the Finance Act of 1909-10, and he produces figures to substantiate his contention that the measure referred to has proved a most serious deterrent to house building development.

The Act has been in operation six years, but as any comparison with the war period would be misleading, he deals only with the four years before hostilities commenced. He gives two examples—Birkenhead and Warrington. In the former the average number of new houses erected prior to to the Budget was 640, and the four years following the average dropped to 263. In Warrington the average number of new houses erected preceding the measure was 226, and in the following four years the average was 68.

A second cause was the natural corollary of the first—the diversion of hundreds of thousands of pounds from real estate into other channels, thus drying up the financial resources which hitherto had been available for estate development, this being due to want of confidence, uncertainty as to future land legislation and the depreciation of capital value. Then on top of this came the war, which brought in its train the inflated cost of material and labour difficulties.

ON THE VERGE OF EXTINCTION.

"This large and very important industry is on the very verge of extinction, if it is not already defunct," said Mr. Hughes, who recalled the statement made by Mr. John Burns in 1909 that 7 per cent. of the male population in the United Kingdom were employed in the trade, which had become the second largest industry in the country, affording employment for over 1,000,000 people.

The speaker proceeded to deal at length with town planning. The present scheme, he said, was the very antithesis of what the spirit of the Act foreshadowed, and was resulting in paralysis of estate development in the areas affected instead of anticipating and fostering it. In a word, it was a block to progress: it was only so much confusion.

To remedy the state of affairs at present in existence, "which is developing into so serious a social and economic problem," Mr. Hughes made several interesting recommendations. Briefly summarised, they are as follow:—

The main arterial roads throughout the United Kingdom to be determined as to direction, width and other details by a National Road Board, and embodied in the schemes of town-planning boards.

The establishment of town-planning boards throughout the country to deal with larger areas than those contemplated within the limits of local authorities under the existing Act. The schemes in such town-planning boards to be completed and submitted to the Local Government Board within a period of three years from the date of their appointment.

The institution of district building boards co-ordinated with the town-planning boards, with the power to make recommendations for State mortgages to builders and others with a view to the resuscitation of private enterprise in artisan house-building.

Power to local authorities to undertake the initial cost of new street-making involved in connection with estate development in accordance with schemes which may be approved by district building boards.

"These recommendations, if adopted, taken in conjunction with the operations of local authorities in connection with the provision of the lowest-rented labouring class, and which, it is anticipated, will be undertaken on a large scale at the conclusion of the war, should, in my opinion," Mr. Hughes adds, "prove largely instrumental in solving what we must regard to-day as a most serious national problem."

For the past financial year the net profits of the Canada Cement Company were $2,218,848, a gain of $476,835. After providing for prior charges and 4½ per cent. dividend paid on the ordinary stock, $432,589 is carried forward. President W. C. Edwards reports that earnings from the cement business proper were more than sufficient to take care of all fixed charges, preference dividends and ordinary dividends chargeable to year's profits.

Mr. Henry J. Pfungst, who died last Sunday week in his seventy-third year, was well known as a collector of drawings and miniatures by British artists. He had many fine sketches by Gainsborough, and his "pictures in little" included excellent portraits by Mary Beale, Samuel Cooper, Lawrence Crosse, Thomas Flatman, Nicholas Hilliard, John Hoskins, and Isaac and Peter Oliver. Some time ago his miniatures were exhibited at the Victoria and Albert Museum.

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BOARD OF EDUCATION.

Examinations in Art, 1917.

The regulations for examinations in art, 1916, rules 110, with the syllabuses published in Appendix I., continue in force for 1917.

The timetable of examinations for 1917 is given below.

Owing to the continuance of the war, it may prove necessary at a later date to suspend the examinations, and in that event the Board will endeavour to give as long notice of the change as possible.

Time Table of Examinations.

Examination in Drawing.

Drawing from the Antique.—Monday, May 21, 10.30 a.m. to 1.30 p.m., 2.30 p.m. to 3.30 p.m.

Anatomy.—Monday, May 21, 4 p.m. to 6.30 p.m.

Drawing from Life.—Tuesday, May 22, 10.30 a.m. to 1.30 p.m., 2.30 p.m. to 3.30 p.m.

Perspective.—Wednesday, May 23, 10.30 a.m. to 1.30 p.m.

Drawing from Memory.—Wednesday, May 23, 2.30 p.m. to 6.30 p.m.

Architectural Drawing.—Thursday, May 24, 10.30 a.m. to 2.30 p.m.

Examination in Painting.

History and Methods of Painting.—Saturday, May 19, 10.30 a.m. to 2.30 p.m.

Drawing from Life.—Monday, May 21, 10.30 a.m. to 1.30 p.m., and 2.30 p.m. to 3.30 p.m.

Painting from Still Life, Antique, or Drapery.—Thursday, May 24, and Friday, May 25, 2.30 p.m. to 5.30 p.m. each day, 10.30 a.m. to 12.30 p.m.

Painting from Life.—Monday, June 4, to Saturday, June 9 (inclusive), 10.30 a.m. to 1.30 p.m., and 2.30 p.m. to 4.30 p.m. each day.

Figure Composition.—Monday, June 11, to Friday, June 15 (inclusive), 10.30 a.m. to 1.30 p.m., 2.30 p.m. to 5.30 p.m. each day.

Examination in Modelling.

History of Sculpture.—Monday May 21, 10.30 a.m. to 1.30 p.m.

Methods of Sculpture.—Monday, May 21, 2.30 p.m. to 5.30 p.m.

Modelling Hand and Wrist, etc.—Tuesday, May 22, and Wednesday, May 23, 10.30 a.m. to 1.30 p.m., and 2.30 p.m. to 5.30 p.m. each day.

For Candidates to Cast Models of Hand and Wrist, etc.—Thursday, May 24, 10.30 a.m. to 1.30 p.m., and 2.30 p.m. to 5.30 p.m.

Modelling from Life.—Monday, June 4, to Monday, June 11 (inclusive), 10.30 a.m. to 1.30 p.m., and 2.30 p.m. to 5.30 p.m. each day.

Casting.—Tuesday, June 12, to Thursday, June 14 (inclusive), 10 a.m. to 1.30 p.m., and 2.30 p.m. to 6.30 p.m. each day.

Modelling Design.—Friday, June 15, 10.30 a.m. to 1.30 p.m., 2.30 p.m. to 5 p.m., and 5.30 p.m. to 7 p.m.

Casting.—Saturday, June 16, and Monday, June 18, 10.30 a.m. to 1.30 p.m., and 2.30 p.m. to 5.30 p.m. each day.

Figure Composition.—Tuesday, June 19, to Friday, June 22 (inclusive), 10.30 a.m. to 1.30 p.m., and 2.30 p.m. to 5.30 p.m. each day.

Casting.—Saturday, June 23, to Wednesday, June 27 (inclusive), 10.30 a.m. to 1.30 p.m., and 2.30 p.m. to 5.30 p.m. each day.

(See note as to casting below.)

Examination in Pictorial Design.

Preliminary Knowledge.—Monday, May 21, and Tuesday, May 22, 7 p.m. to 10 p.m. each evening.

Figure Composition.—Wednesday, May 23, and Thursday, May 24, 7 p.m. to 10 p.m. each evening.

History and Methods of Engraving.—Friday, May 25, 7 p.m. to 10 p.m.

Original Design.—Tuesday, June 5, and Wednesday, June 6, 7 p.m. to 10 p.m. each evening.

Examination in Industrial Design.

Preliminary Knowledge.—Monday, May 21, and Tuesday, May 22.—7 p.m. to 10 p.m. each evening.

*Drawing from Historic Ornament.—Wednesday, May 23, and Thursday, May 24, 7 p.m. to 10 p.m.

†Modelling from Historic Ornament.—Wednesday, May 23, and Thursday, May 24, 7 p.m. to 10 p.m. each evening.

History and Styles of Ornament.—Monday, June 4, 7 p.m. to 10 p.m.

For Candidates to Cast their Models from Historic Ornament.—Tuesday, June 5, 2 p.m. to 10 p.m.

Original Design.—Wednesday, June 6, Thursday, June 7, and Friday, June 8, 7 p.m. to 10 p.m. each evening.

†Casting Original Designs.—Saturday, June 9, 2 p.m. to 10 p.m.

(See the note as to casting below).

NOTE AS TO CASTING.

N.B.—(i.) The candidate is required to cast his own exercise in two cases only—viz., modelling the hand and wrist, etc. (modelling examination), and modelling from historic ornament (industrial design examination).

(ii.) In other cases models may be cast either by the candidate, with or without assistance, or by a professional moulder or other person skilled in casting. (See paragraph 21 of the art examination syllabuses, in Appendix I.)

(iii.) All casting, whether by the candidate or by any other person, must be done at the examination centre under superintendence within the hours respectively indicated in the time-tables.

* To be taken by candidates who select crafts which do not involve modelling, viz., enamelling, painting and decorating, wall-paper manufacture, mosaic, glass painting or stained glass, cabinet work, wood inlaying, tapestry, embroidery, dress design, lace making, carpet weaving, linen weaving, cotton weaving, silk weaving, wool weaving, cotton printing, typography, illumination, book binding, leather work, linoleum manufacture.

† To be taken by candidates who select crafts which involve modelling, viz., iron work, lead work, light metal work, gold and silver smithing, jewellery, die sinking, stone carving, plastering, wood carving, pottery, tile painting and modelling, glass blowing.

Building Intelligence.

Glenariff.—A new church at Glenariff, Co. Antrim, is in course of erection near Glenariff Glens, Co. Antrim, a short distance from the site of the old church, which was completely destroyed by fire in the summer of 1915. The building will be of substantial construction owing to its exposed position, situated as it is within a few yards of the beautiful coast road running from Larne to Cushendall. The external walls will be built on the cavity system. The facings or outer shell will be of local red sandstone. The dressings will be of Portland stone, the roof covering of green slates; the joinery work throughout will be of pitch pine, the entrance doors of oak. Accommodation is provided for 400 persons, including a gallery and choir space. Messrs. Thornbury Brothers are the building contractors, and the architect is Mr. W. J. Moore, 35, Royal Avenue, Belfast.

OBITUARY.

The American colony at Rome has lost one of its oldest members by the death, at the age of seventy-four years, of the well-known sculptor, Moses Ezekiel. Moses Ezekiel was born at Richmond, Virginia, and after service with the corps of cadets in the Confederate States Army, he graduated in the Virginia Military Institute. He studied anatomy in the Medical College of his native State, and then proceeded to Berlin, where he was admitted into the Society of Artists, on the merits of his colossal bust of Washington. He was the first foreigner to win the Prize of Rome. Mr. Ezekiel was commissioned by the Jewish Order of the Sons of the Covenant to execute the marble group representing "Religious Liberty" for the Centennial Exhibition; and among his other works were busts of Liszt, Homer, David, and Judith, and the bust of Lord Sherbrooke in St. Margaret's Church, Westminster.

The Bushey (Herts) U.D.C. have agreed to increase the salary of Mr. A. Ryder, their surveyor.

The King has appointed Major-General Sir George John Younghusband, K.C.M.G., K.C.I.E., C.B., to be Keeper of the Jewel House, Tower of London, in the room of General Sir Arthur Singleton Wynne, G.C.B., resigned.

The death took place on the 26th ult. of Mr. Wm. O'Connell, Chairman of the Cork Builders' Association. He was contractor for the buildings of the Cork International, and was the first in the city to introduce deco-fronts, of which he made a speciality.

Captain Dudley Fletcher Goodwin (unestablished assistant, Architect's department, of the London County Council), Royal Field Artillery, has lost his life on war service, dying of wounds. William Maxim (labourer, estate and valuation department), private, Royal Field Artillery, has been killed in action.

The formal opening of the new city hall in Orillia, Ont., recently took place. This building has been erected at a cost of $71,000, not including the value of the old walls, which remained standing after the fire of June, 1915. The lower floors contain commodious municipal offices and the council chamber, with market rooms in the rear, while the upper story will be used as an opera house. The building is largely fireproof in construction, and was built from plans prepared by Burke, Horwood and White, of Toronto.

Our Office Table.

The Lords Commissioners of his Majesty's Treasury give notice that, in pursuance of the powers conferred on them by the Public Works Loans Act, 1897, they have been pleased to direct by their Minute of March 26, 1917, that on loans granted out of the Local Loans Fund, subsequently to the date of that Minute, there shall be chargeable, in lieu of the rates fixed by Treasury Minute of March 31, 1916, the following rates of interest, viz.: I. Loans to Local Authorities for any purposes of the Housing Acts and the Small Holdings Acts—Any period, 5½ per cent. II. Other Loans secured on Local Rates—Not exceeding thirty years, 5½ per cent.; not exceeding fifty years, 5¾ per cent. III. Loans not secured on Local Rates—(a) Loans under the Harbour and Passing Tolls Act, 1861—(i.) With collateral security of property. Not exceeding thirty years, 6 per cent.; not exceeding fifty years, 6¼ per cent. (b) Loans under the Housing Acts—(i.) To companies and private persons limiting their profits as provided by Treasury Minute of November 14, 1890. Not exceeding thirty years, 5¼ per cent.; not exceeding forty years, 5¾ per cent. (ii.) To companies and private persons not so limiting their profits. Not exceeding thirty years, 6 per cent.; not exceeding forty years, 6¼ per cent.

It is a common observation by plumbers that the pipes carrying the hot water from the boiler to the kitchen and bathroom burst from freezing far more frequently than the pipes carrying the cold water. Experiments have been made with glass tubes, the practical conditions being simulated as nearly as possible. The results confirm the above observation, and show that the occluded air in tap water is responsible for the delay or absence of bursting of the pipes, says Mr. F. C. Brown in the *Physical Review*. The air and accompanying impurities assist in furnishing nuclei of crystallisation so that the ordinary tap water begins to freeze at the usual freezing point. At the same time the ice formed is more mobile, especially near the middle of the tube, so that until very low temperatures are reached the pressure is released along the middle of the tube by the flow of water and ice. In addition, the air bubbles displacing water form cushions which also relieve the pressure on the tube to a certain extent.

Since reinforced concrete was introduced into this country, it has been customary to employ plain round mild steel bars, but Mr. A. W. C. Shelf, in his paer on "High Tensile *versus* Mild Steel for Reinforced Concrete," read before the Society of Engineers, endeavours to prove that plain mild steel bars are not the best to employ for this purpose, but that greater efficiency and economy is obtained by physically developing mild steel bars, for the purpose of taking out the first yield in the steel, which is useless and has a detrimental effect in concrete. When this first yield or stretch is taken out a higher yield-point is obtained without any injury to the steel, so that it is safer to employ a stress of 20,000 lb. per square inch (which results in a saving of 20 per cent. in the weight of steel required) than it was to employ a stress of 16,000 lb. per square inch before the steel was physically developed, and for this reason the author of the paper thinks that the existing regulation of the London County Council relating to the stress on steel should be altered to avoid the cramping of industrial progress.

Canon Alexander, preaching last Friday at St. Michael's, Cornhill, on behalf of the Preservation Fund of St. Paul's Cathedral, said that the condition of the fabric had been the cause of very considerable anxiety to the Cathedral authorities, and not least during the last few weeks. The main trouble lay in the great piers, and in parts adjacent to them, in which serious internal fractures had recently been discovered. The mischievous and concealed effects of time, as shown, for example, in the extensive rusting of iron cramps, had combined with the immense and unevenly distributed weight of the dome to produce a

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state of things which, if it had not been taken in hand, would certainly have resulted in disaster before long. Experts could not tell when the work of repair would be completed, or what further difficulties would be encountered; but, though it was possible to obtain in Berlin an artistic photograph of St. Paul's in ruins, he had every reason to hope that for many centuries to come the golden cross would continue to send its great appeal over London.

"The Calculations of Steel Frame Structures," by Walter Cocking, M.C.I. (London: Scott, Greenwood, and Son, 8, Broadway, E.C., 5s. net), has been compiled to comply with the requirements of the London County Council, and some useful notes are added on the application of theory to practical design. It contains 312 pages, with seventy-eight illustrations, numerous worked examples, and a complete series of calculations for a steel-frame warehouse. The author's experience as a structural engineer and lecturer at the London County Council School of Building has been well utilised in the preparation of the manual which supplies a want.

The preparation of housing and town-planning schemes to be placed in operation at the close of the war was discussed at a conference held in the Memorial Hall, Manchester, on Saturday. Mr. J. Walsh (Painters' Union) moved a resolution urging the Government to give legislative effect, with the least possible delay, to a national after-the-war housing policy, which should, at the same time, provide healthy houses and avert any crisis of unemployment which might arise in the building trade at the close of the war. The resolution also urged local authorities to appoint housing committees, to make inquiries as to the housing needs of their areas, to select suitable land, and to plan out such land on town-planning lines. Alderman Farr seconded the resolution. Councillor S. Smethurst, past president of the National Federation of Building Trade Employers (Oldham), did not think the work would be well, economically, or rapidly done if delegated to public authorities. In the course of further discussion some speakers emphasised the great need of effective agitation amongst the workers. Others urged that not much could be expected from local authorities, which were largely composed of owners of bad house property. The view was also put forward that the work was one in which co-operative societies might take a substantial part. The resolution was passed unanimously. At the evening meeting Mr. Shaw cross quoted statistics which showed that during the next ten years 500,000 houses would be required to replace insanitary dwellings, 330,000 houses would be needed to overtake deficient building during the last seven years, and 800,000 houses to provide for the increase of the working-class population, making a total of 1,630,000 houses. If the cost was taken at an average of £260 each, there would require to be spent about £40,000,000 a year for the next ten years.

The Lords Commissioners of his Majesty's Treasury have, after consultation with the Trustees of the National Gallery, constituted a separate Board of Trustees for the purpose of managing the affairs of the National Gallery of British Art (Tate Gallery). The following have been appointed trustees on the new Board:—Lord Plymouth, Lord d'Abernon, Mr. R. C. Witt and Mr. C. J. Holmes, representing the Trustees of the National Gallery; Lord Henry Bentinck, M.P., Mr. John Sargent, R.A., Mr. D. S. MacColl, Mr. Robert Ross, Mr. J. R. Holliday, and Mr. C. Aitken (Keeper of the Tate Gallery). It is understood that the object for which the separate Board is constituted for the Tate Gallery is to provide for a representative body interested in and able to deal with various questions relating to modern art.

Writing to the *Times* from the Rectory, Rotherhithe, the Rev. J. C. V. Durell asks:—"Can anything be done to save from its threatened destruction the glorious Cathedral of Laon? A glance at the war map will show that Laon lies in the line of the German retreat. The straightening out of the Chauny salient will bring the French within sight of its walls. By a series of ridges the ground rises from the south-west to the lofty plateau on which the city is built. On its north-eastern face the plateau terminates in a bluff, which falls precipitously to the plain. On the edge of this bluff stands the cathedral, commanding a wonderful view of the level country beyond. The time will soon come when the invaders are hurled from this point of vantage, and then will be the moment of danger for the cathedral. The hordes, who are destroying with reckless wantonness as they retire everything of value in the beautiful land of France, will not hesitate to blow to pieces this noble monument, on the plea that their enemies would use it as an observation post. Could not the punishment for such an act be assessed beforehand and made known to the German authorities? The palaces of Potsdam and Berlin are not worth a single sculpture in this irreplaceable cathedral, but the solemn statement that they, together with that colossal vulgarity the Sieges Allee, would be razed to the ground as a punishment if the cathedral were destroyed would probably act as a deterrent to the barbarians whose defiling touch has been laid on the fair face of France."

The Germans have razed the historic castle of Coucy, with its great keep 200 feet high and the towers, each 100 feet high, which crowned the angles of its walls. Once before in its history its destruction had been ordered. Mazarin was bent on rendering useless a fortress that was almost impregnable against such weapons as the time possessed. The men he sent for its destruction soon wearied of their task, and spared the work of art. They were content to deprive Coucy of its dangerous strength. They tried to blow up the keep, and their explosives brought down all the interior rooms and staircases, but the shell of the tower, with its enormous walls, remained intact. It was left for the Boches, with twenty-eight tons of explosives, if what they say be true, to destroy a wonderful and interesting building that had ceased to have any practical military value. The present state of the castle resembles a mountain side after a great landslide. Huge blocks of masonry and stone are piled one on the other, and only a few fragments of the outer walls, many yards thick though they were, are all that is left of the superstructure.

Part I. of Vol. VIII. of the *Transactions* of the St. Paul's Ecclesiological Society (London: Harrison and Sons, 45, Pall Mall, 5s.) is an interesting issue. It contains the *Proceedings* at meetings and visits of the last session, with the Annual Report, which, we are glad to note, is of a satisfactory character, financially and otherwise. The society has lost twelve and added sixteen members during the year, and its total membership is now 253. There is a good account of the Church of St. Michael, Cornhill, by Mr. Philip Norman, LL.D., V.P.S.A.; one on "The Endings of the Collects of the Book of Common Prayer," by the Rev. Vernon Staley; another on "The Liturgical Chaunts," by Mr. E. G. Cuthbert F. Atchley, and another on "The Nonjurors," by Mr. H. P. K. Shipton, to which is prefixed a portrait of Thomas Brett, one of the Bishops consecrated by the nonjurors, whose "Ancient Intrigues" is still valuable, and who compiled the "New Communion Office" for the "Usagers" of the separatists.

At the outbreak of war the male members of the Society of Architects' clerical staff offered themselves for military service. The junior, J. Jones, was accepted, joined the Royal West Kent Regiment, and was wounded in the head at Hooge. He has been since promoted to corporal and has returned to duty.—The assistant secretary, Mr. W. E. Wanmer, was rejected as unfit, and joined the V.T.C. He was subsequently re-examined and passed for general service, and has joined the 28th County of London Regiment (Artists' Rifles).—The Secretary being over the age limit, and therefore ineligible for the Army, took up Red Cross work, qualifying in three subjects. He joined the A.A., V.A.D., London 43, and worked also with the London Ambulance Column, both as stretcher-bearer and ambulance and hospital orderly. He resigned to take a commission in the Volunteer Force (County of London).—To fill the vacancy on the council caused by the death of the late Mr. Edward Cratney, of Newcastle-on-Tyne, the council have co-opted Mr. A. G. Ware, of Bournemouth, for the unexpired period of the late member's term of office.

The expansion of quicklime when wet develops an enormous force, that acts slowly and almost irresistibly, and has long invited use for mechanical purposes. Successful efforts to make use of this force have been noted in a recent issue of "Rock Products," that describes its efficient use in breaking up heavy brick masonry. A number of 12 feet by 20 ft. piers, 12 ft. high, was situated between similar foundation piers for engines in operation, and it was necessary to remove them without injuring the machinery. Blasting was, therefore, inadmissible, and hand cutting and breaking too slow and expensive. The work was accomplished by drilling 3 ins. vertical holes 3 ft. deep and 3 ft. apart in both directions over the entire areas of the piers, and filling them within 6 ins. of the top with fresh slaked lime, in pieces ½ in. to 1½ ins. wide. As soon as the lime was thoroughly wet the top of the holes were filled with brick drilling well tamped, and in about ten minutes cracks started in every direction, and the entire tops of the foundation pier was broken into 3 ft. cubes.

TO ARMS!

1st LONDON ENGINEER VOLUNTEERS.

Headquarters, Balderton Street, Oxford Street, W.

Orders for the week. By Lieut.-Col. Clay, V.D., Commanding.

OFFICER FOR THE WEEK.—Platoon Commander Hughes-Hallett.

NEXT FOR DUTY.—Platoon Commander No. 1 Platoon.

MONDAY, APRIL 9.—Headquarters closed. Last day of Easter Training at Esher. Parade Waterloo, opposite No. 5 Platform, 9 a.m.

WEDNESDAY, APRIL 11.—Instructional Class, 6.15. Platoon Drill, Platoon No. 2.

THURSDAY, APRIL 12.—Platoon Drill, Platoon Nos. 5 and 6. Signalling Class. Ambulance Class.

FRIDAY, APRIL 13.—Technical for Platoon No. 10, Regency Street. Platoon Drill, Platoon No. 9. Recruits' Drill, 6.30.

SATURDAY, APRIL 14.—N.C.O.s' Class, 2.30, under Captain Bentley and the Instructor of Musketry. Subjects: Extended Order Drill and Musketry.

SUNDAY, APRIL 15.—Orders will be posted at Headquarters.

MUSKETRY.—For all Companies see Notice at Headquarters.

NOTE.—Unless otherwise indicated, all Drills will take place at Headquarters.

By Order,
MACLEOD YEARSLEY,
Captain and Adjutant.

March 31, 1917.

Mr. H. Gibbon, surveyor to the Axminster Urban District Council, has resigned.

Mr. William de Morgan, of 127, Church Street, Chelsea, S.W., the well-known artist and author, one of the founders of the Arts and Crafts Exhibition Society, who died on February 15 last, aged seventy-seven years, left estate of the gross value of £3,953, of which £3,494 is net personalty.

A faculty, authorising the deposit under the floor of the crypt of the Church of the Annunciation, Bryanston Street, of an urn containing the cremated remains of Vice-Admiral Sir George Warrender and the erection of a memorial tablet in the church, has been granted by the Chancellor of the Diocese of London. Sir George Warrender, who died on January 8, expressed a desire that his body should be cremated.

A handy rule for finding approximately the quantity of water in circular drains, sewers, etc., is as follows:—Square the diameter of the pipe in inches, and point off one figure from the right in the product. The result will be the number of gallons in one yard length of the pipe. Thus, how many gallons of water will be contained in a 6 in. drain which has a length of 30 ft.; 6 in. × 6 in. = 36, *i.e.*, 3.6 gallons × 10 yds = 36 gallons.

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TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

***Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.

Telegrams: "Timeserver, Estrand, London."
Telephone: Gerrard 1291.

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***Our Direct Subscription Agents for Australia are Messrs. E. T. Kibblewhite and Co., Printers and Publishers, 19, York Chambers, 105, Liverpool Street, Sydney, New South Wales; for Japan, The Maruzen Co., Ltd., 11-16, Nionbashi Tori Sanchome, Tokyo; who will receive Subscriptions at £1 10s. per annum on our account. Copies of the paper will be sent by us direct to the subscribers' address.

***The special rate to Canada is £1 10s. = $7 30c. for 12 months, and 15s. = $3 65c. six months. Our Direct Subscription Agents for Canada are Messrs. Selle, Ltd., 302, Shaughnessy Buildings, McGill Street, Montreal, who will receive Subscriptions, £1 10s. per annum, on our account.

Cheques and Post Office Orders to be made payable to THE STRAND NEWSPAPER COMPANY, LIMITED, and crossed London County and Westminster Bank.

NOTICE.

Bound Copies of Vol. CX. are now ready, and should be ordered early (price 12s. each, by post 12s. 10d.), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XLI., XLVI., XLIX., LIII., LXI., LXII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXXI., LXXII., LXXIII., LXXIV., LXXV., LXXVI., LXXVII., LXXIX., LXXX., LXXXI., LXXXII., LXXXIII., LXXXIV., LXXXV., LXXXVI., LXXXVII., LXXXVIII., LXXXIX., XC., XCI., XCII., XCIII. XCIV., XCV., XCVI., XCVII., XCVIII., XCIX., C., CI., CII., CIII., CIV., CV., CVI., CVII., CVIII., and CIX., may still be obtained at the same price; all the other bound volumes are out of print.

BACK ISSUES.

Most of the back issues are to be had singly. All back issues over one month old will be charged 6d. each, postage 1d. Subscribers requiring back numbers should order at once, as they soon run out of print.

Handsome Cloth Cases for binding the BUILDING NEWS, price 2s., post free 2s. 5d., can be obtained from any Newsagent, or from the Publisher, Effingham House, 1, Arundel Street, Strand, W.C.2.

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The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight Words, the first line counting as two, the minimum charge being 5s. for four lines.

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Advertisements for the current week must reach the office not later than 3 p.m. on Tuesday. Front-page advertisements and alterations or stop orders for serial advertisements must reach the office by first post on Monday to secure attention.

RECEIVED.—G. S. and Co., Ltd.—B. A. Co., Ltd.—A. W.—J. T., Ltd.—N. S. and Co.—W. F. S. and Co., Ltd.—J. H. and Co., Ltd.—W. S. Co., Ltd.

R.—No.

T. L. S.—Please send

W. G. P.—Will bear in mind. At present impossible.

DOMUS.—We cannot undertake to advise as to suitable sites or materials.

A. G. L.—All we know is that a receiver was put in. Our impression is that nobody was ever paid.

G. F. K.—We should advise a good low-pressure system like that installed at Queen's House, Kingsway, further details of which we illustrate this week. See description on another page.

The death of Mr. Richard Frederick Taylor, a prominent City auctioneer, and partner in the firm of Messrs. Jones, Lang and Co., 3, King Street, Cheapside, E.C., took place on Monday, March 26, at his residence, 17, St. Mildred's Road, Lee, at the age of 61 years.

In the museum of the Dublin Architectural Association there is now an exhibit of small, thick, heavy slates from the Killaloe Slate Quarry. This exhibit, says the *Irish Builder*, should be of the greatest interest to all architects who are tired of the commonplace, large, thin Welsh slates—and what architect is not? Used in this way the Killaloe slates are an excellent and most durable roofing material. Some of the most important public buildings of the eighteenth century in Dublin are covered with them.

LIST OF TENDERS OPEN.

BUILDINGS.

April 5.—Erection of a Sub-station at York Place, Aberdeen; the excavation, drainage, mason, carpenter, painter, plumber, slater, and plaster work, to be one contract.—For the Town Council (Electricity Department).—J. A. Bell, City Electrical Engineer, Millburn Street, Aberdeen.

April 7.—Rebuilding Sea Walls and subsidiary works on the road from Strangford to Ardglass, in the townland of Cloghy, according to specification and drawing to be seen at the County Surveyor's Office, Courthouse, Downpatrick.

April 12.—Remodelling Pig-styes at the Bermondsey Military Hospital, Ladywell, S.E., according to specification.—For the Bermondsey Board of Guardians.—E. P. Fenton, Clerk, 283, Tooley Street, S.E.

ENGINEERING.

April 12.—Construction of a reinforced concrete Waste-water Tank at the Bradford Road, Manchester, station.—For the Gas Committee.—Gas Offices, Town Hall, Manchester.

April 14.—Supply of a small portable Baling Press, with wheels, for baling waste paper, etc.—For the Tewkesbury Town Council.—H. A. Badham, Town Clerk, Tewkesbury.

April 30.—Installation of a Vacuum Steam-heating System, and Supply and Erection of Powerhouse Buildings and Chimney.—For the Canterbury University College, Christchurch, N.Z.—The Registrar of Canterbury College, Christchurch, N.Z.

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

FENCING.

April 10.—Supply and erection of chestnut wood Fencing and Gates for Allotments at Matthew's Lane, Levenshulme, and Cypress Street, Harpurhey.—For the Small Holdings and Allotments Committee.—City Surveyor's Office, Town Hall, Manchester.

PAINTING.

April 17.—Outside Painting at the County Police Stations at Birtley, Coxhoe, Ferryhill, Fighting Cocks, Norton, Sacriston, Sedgefield, Spennymoor, Thornley, and Wingate.—For the Durham County Council.—County Surveyor's Office, Shire Hall, Durham.

ROADS AND STREETS.

April 7.—About 600 tons 1½ in. to 2½ in. Tar Macadam, 25 tons ¾ in. ditto, and 25 tons ¾ in. Slag and Dust, to be delivered London Road Wharf, Derby.—For the Alvaston and Boulton Urban District Council.—W. J. Holbrook, Clerk, Alvaston, Derby.

April 9.—Hoggin, Flints, and Ballast.—For the Whitstable Urban District Council.—J. F. Whichcord, Clerk, Council Offices, Whitstable.

April 10.—Slag, Kentish Flints, Local Materials, and Team Labour and hire of a steam road-roller.—For the Lexden and Winstree Rural District Council.—E. B. Potter, Acting Clerk, Victoria Chambers, Colchester.

April 10.—Three hundred tons of Tarred Macadam and 880 tons of ordinary Welsh Macadam, Chippings, etc.—For the Sandbach Urban District Council.—A. E. Stringer, Clerk, Sandbach.

April 16.—Three hundred yards Granite (Leicester); 300 yards clean Hoggin; 200 yards clean, sharp Sand, suitable for covering tarred roads; and 200 yards Kent Ragstone, free from haesock, etc., the whole to be delivered in barges alongside Sheerness Pier, or by rail at Sheerness Station, at contractor's cost.—For the Sheerness Urban District Council.—V. H. Stallon, Clerk, Council Offices, Sheerness.

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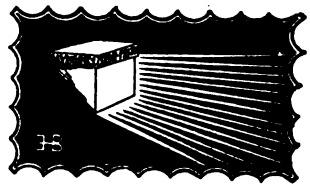
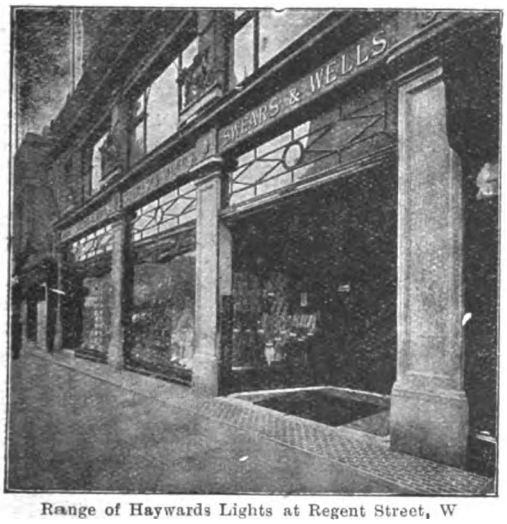
HAYWARDS

LIGHTS





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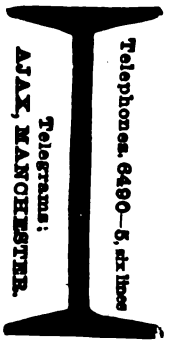

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Currente Calamo.

The report to the Housing and Town Planning Committee of the Dundee Town Council, for preparation for work after the termination of the war, by Mr. Jas. Thomson, the city architect, which has reached us, is one of the most business-like we have seen. The city architect very properly warns the Town Council that if it hopes to face the problem with any degree of success the work must not be done in small sections scattered promiscuously over existing congested or insanitary areas. Ample areas of unbuilt-on land may be obtained conveniently near the work of the people, and on these, it is urged, the houses should be built, on a large scale, in which a higher standard of living may be encouraged. That is the right note to sound. The scheme is badly wanted, for during the past five years only twenty-three houses for working people have been built in Dundee, although the population has increased by 7,000 during that period. Three projects are submitted, each being illustrated by plans, and a fourth plan is given showing how the three schemes jointly would benefit the whole industrial area of the city. Further plans are given, showing the lay-out of the three schemes, and it will be seen from these that the main advantages of open space, sunlight, and convenience have been well provided for. Sketch plans are also given of a house which should adequately meet the requirements of a single woman or two single women or a widow with no family, of a married couple with a small family, and of a married couple with a large family; and in the preparation of these plans the opportunity is taken of showing how persons of the working classes who are sufficiently aspiring may be enabled, as they are clearly entitled, to raise themselves from their present insanitary and sordid surroundings to dwellings which provide nothing more than the just due of human beings.

In connection with the military operations near St. Quentin, lovers of art are concerned as to the fate at the hands of the enemy of the chief contents of its small but famous museum. Maurice Quentin de la Tour, the acknowledged master of French pastellists, was born in the town, whose name he took in 1704, and there in 1788 he died. The museum, which, it is stated, has by express injunctions of the German authorities remained open, at any rate until quite recently, contains by far the finest extant collection of pastels by La Tour. As against thirteen or fourteen in the Louvre, including a magnificent portrait of Madame de Pompadour, for which the artist received 24,000 frs. in 1755, there are in the museum at St. Quentin no fewer than eighty-five works, many of them of the very highest quality. These are extolled by the Goncourts in an eloquent passage of their writings. It may be recalled that at the Jacques Doucet sale, held in Paris six years ago, the artist's pastel of Duval de l'Epinoy was bought by Baron Henri de Rothschild for £24,000, plus auction charges, of 10 per cent., this though it had fetched no more than 5,210 frs. in 1903. Half a century ago, indeed, pastel portraits by La Tour were piled up in bric-a-brac shops, and were obtainable at ridiculously small sums.

The April issue of the "News Sheet" of the Bribery and Secret Commissions Prevention League, obtainable at its offices, 9, Queen Street Place, E.C., should be carefully studied. It is a wholesome but nevertheless disquieting record of recent convictions of people, several of them in good positions, whose treachery within the country in this time of perilous war seems to us of the vilest nature; for, surely the man who sells his country by accepting bribes for passing bad or imperfect articles bought for the national service is a more dangerous citizen than the spy or the accomplice of the enemy in his designs on the life and property of British subjects. The cases reveal facts which must inevitably give rise to suspicions that they by no means stand alone, and that these are responsible for more of the waste and muddle which has characterised our war expenditure from the beginning. It is, therefore, the duty of all honest men to familiarise themselves with the methods in which such disgraceful transactions are conducted, and to take care that they are not unwittingly made parties to such. That scoundrels of the type indicated will cease their malpractices till they are shot without mercy is, possibly, too much to expect, but that their infamy should be unmasked and such very lenient punishment as the law accords promptly meted out to them is earnestly to be desired.

An appeal to the House of Lords has been decided upon by the Metropolitan Water Board against the recent decision of the Court of Appeal in the matter of the Board's action against Messrs. Dick, Kerr and Co., Limited. As previously reported, acting under the powers of the Defence of the Realm Act, the Ministry of Munitions served a notice upon the contractors ordering the cessation of work on the Littleton reservoir. Questions thereupon arose between the Board and the contractors as to the legal effect of this upon the contract. The Board eventually commenced an action in the High Court for a declaration on the matter. In the Court of first instance Mr. Justice Bray decided that the contract was merely suspended by the act of the Ministry of Munitions. The Court of Appeal, however, have reversed this decision, holding that the service of the notice terminated the contract. The principle involved applies not only to the Littleton reservoir contract, but also to that for the construction of the Board's new head offices in Rosebery Avenue. The Law and Parliamentary Committee of the Water Board are of opinion that the Board have no alternative but to take the case to the House of Lords for final decision, and have issued instructions to do so.

On grounds of general interest, we direct attention to an aspect of artistic interest in commemoration of the war as regards individuals, and in the homes of the country, by what have been termed "War Memorials in the Home"; these may take the form of stained-glass medallions of artistically set-out coats-of-arms of persons in the Army or their military or naval badges, together with names or dates inscribed thereon. These medallions may take various forms, but a convenient one is a small circle or shield shape, suitable for hanging in windows, etc. At a recent exhibition by the War Workers Depôt of Wimbledon, held at the Baths Hall, Latimer Road, Wimbledon, a large number of various hospital requisites and comforts were shown by this organisation, and

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one stand contained some stained-glass medallions of various naval and military badges which were lent by Haywards, Ltd. (who are making a speciality of the production thereof), which fittingly represented the badges and names and dates of interest in connection with the various naval and military units in the present war, thus constituting lasting memorials on the lines of the old custom in the castles and houses of the middle and later ages, which have brought down to us the fine examples of this class of work seen about the country, and which it would be most advantageous again to bring forward. Of far greater permanence and intrinsic beauty than some of the transient, and in some cases hardly worthy, memorials we have seen, they would also afford opportunities of individual design appropriate to special needs, and never sinking into the commonplace.

Mr. Morley Fletcher, the Director of the Edinburgh School of Art, has been lecturing "Somewhere in France" to the troops in the war zone, and was agreeably surprised at the keen interest of the men, especially the Scotsmen and the Australians. At one munition dump he spoke about art in its relations to national reconstruction after the war, and sought to disabuse the minds of his audience of any conception of art as something merely ornamental and extraneous to practical life. Literature, it was explained, is an expression of the spirit of one's life. Art decides the external form of the whole of civilisation. The definition of art as "thoughtful workmanship" was put forward as a compendious definition. Some remarkable parallels were found in the life at the front. The cave-dwelling palæolithic man, for instance, after he had fashioned his shelter, arrived at a time when, sheer necessity provided for, he undertook its further elaboration in the spirit of the artist. The same development is found at the front, where, as soon as the soldier has formed his dugout, under the compulsion of the requirements of safety, he proceeds to embellish it, making it more attractive and habitable, and decorating the outside with names that cause a smile. This is the art instinct working within him. A more penetrating illustration was afforded by the fact that the men at the front have been enabled to make war in the spirit of the artist, so far as they are able to take a pride in the particular work they are doing. In many cases this is a new experience, which will have important results after the war. I found the men very much interested, said Mr. Fletcher, when I spoke about the situation at home and of the position that would arise with the men coming back from the front. The result will be that a great deal of this mechanical life with which we were familiar before the war will have to be altered. There are men who have come from factory life—which under past conditions is often a pitiful life—men who have been prosecuting the war, possibly unconsciously, in the spirit of art, who have known something of pride and style in their work. When these men come back they will find a great deal in the old conditions of life which it will be impossible for them to endure.

A number of black-and-white sketches by the late W. Q. Orchardson are at present on view in the Scottish Arts Club, Edinburgh. They include the artist's original design, in charcoal, of some of his best known pictures. The larger drawings include the "Voltaire," "Master Baby," "The Duke's Antechamber," "Peveril of the Peak," "Bath," "Portrait Group," "Kissing," "Marriage de Convenance, "Her First Dance," "Her Last Dance," "Cleopatra," "Housekeeping and Honeymoon," and several notable figure impressions, including the "Conservatory" and "Hilda." Some interesting portrait studies include "Lord Kelvin," "Sir Peter Russell," and one or two unnamed. The drawings were acquired by Mr. R. E. Miller, Edinburgh, after the death of the painter. The portrait study of Sir Peter Russell and the study for Cleopatra are to go to the National Gallery, and the portrait head of Lord Kelvin to the Portrait Gallery. A number of the drawings are to be shown at the forthcoming exhibition of the Royal Scottish Academy, and afterwards in the Glasgow Arts Club. Their permanent destination is the Edinburgh College of Art.

BENCH ENDS IN ENGLISH CHURCHES.

WITH ILLUSTRATIONS.

No monograph has yet been issued dealing with the seats in English churches from the thirteenth century downwards, and certainly by none could the lack thereof have been better supplied than by Dr. J. Charles Cox, whose opportunities in East Anglia and in Devon and Somerset of studying the skilled carpentry of the mediæval period have, as in so many other directions, so fruitfully contributed to kindred literature. Architects and ecclesiologists will heartily welcome his latest volume, "Bench Ends in English Churches," just issued by the Oxford University Press at 7s. 6d. net. The volume covers 208 pages, and includes 164 illustrations, the very numerous examples shown having been all personally examined by the author.

In the early Church, throughout Christendom, seats in churches were few and far between; but in the West, and more especially in England, the aversion to seats weakened, and eventually resulted in the habit of class-distinction, and the allotment and sale of seats in the House of God. As Dr. Cox says:—

> The early fabrics of English churches lacked all wooden fittings; the altar was of stone, as also were the Mass seats on the south of the quire. As to the congregation, there were stone seats or bench-tables against the walls, which would suffice for the aged or infirm, whilst others in a like condition would be permitted to bring with them a mat or even a stool. These stone benches attached to the base of the walls are far more common than is usually supposed, while a great number have been cleared away when restoration brought about the renewal of the outer walls. Thus in Chaldon Church, Surrey, a long, low stone seat ran along the wall of the south aisle until 1871, when it was "restored" away. The earliest of the churches of Cornwall seem always to have had these stone benches, as at St. Perran-Zabuloe, where a stone seat 16 ins. high and 14 ins. broad runs all round the building, interrupted only by doorways and altar; the same may be noted in the much later south transepts of both Minster and Tintagel.

Probably the first permanent wooden seats in churches were those provided for the use of priests and clerks within the chancel during the choir offices. The custom of supplying permanent wooden seats for any part of the congregation came about very gradually, possibly originating with the fixing of seats in chantry parcloses or guild chapels, and thus spreading to the general body of the church. Fixed seats seem to have been called indifferently "pews" or "stalls" or "seges." The word "pew" has long been associated with a seat in church, yet Milton uses the word to describe the sheep-pens of Smithfield, and Pepys applies it to a box at the theatre. Etymologists have differed widely as to the origin of the word, but, taking the meaning to be an elevated or raised place, it is, as Dr. Cox remarks, easy to see how it came to be used; not only for an official or dignified seat in a church, but also for a set of seats or benches affixed to a frame to raise them, though slightly, above the dampness of the ordinary floor level.

The bench-ends and seats were nearly always made from oak of first-rate quality, and, as oak was cheap and plentiful, are thick, strong, and heavy. Many are in as good condition to-day as when first carved, for old oak does not rot, if protected from damp, it simply crumbles away. The old oak used was cut in the winter when there was little sap, and the bark allowed to remain on. The design of the benches varied greatly, but the construction and general disposition of the seats were generally the same, consisting of a continuous sill laid along the floor, into which the bench ends were stubbed, the seats being supported on brackets placed at intervals, with the backs terminating level with the seats or carried down to the floor; the book-board, often an addition of later days, placed but little higher than the seat, and never slanting, being simply a ledge to lay the book upon when not in use. The ends or standards of the benches were often plain, with a moulded cornice, especially in the earlier examples, but a vast number were elaborately panelled and carved. Favourite subjects in the later bench-ends, especially in Cornwall, were the instruments of the Passion, while in East Anglia the bench-ends often rise into a finial termed the "poppy-head," those in the Western counties being oftener horizontal. The name "poppy" probably was an old French word derived from the Latin *puppis*, the figure-head of a vessel, surviving in our nautical term "poop." Hence the word *poupée*, a French child's doll, and the "puppets" of our own language. Wilars de Honcourt, a thirteenth-century architect, has left behind him a curious manuscript, wherein he jotted down designs which took his fancy, including some bench-ends which he styles *poupées*. Hence the "poppy heads" of the modern writers on English Gothic. The commonest form of the poppy-head is that of the fleur-de-lis, possibly purposely selected as the conventionalised form of the lily as associated with the Virgin Mary.

Dr. Cox has much to say that is interesting about the separation of the sexes during worship in church, about flap-seats, special pews, shriving pews, churching or midwives' pews, movable pews, locked pews, and the like. The locking of pews was one of the scandals of post-Reformation times, and says Dr. Cox:—

> With regard to this locking of pews, it may be remarked that in 1600 the churchwardens' pew at St. John Zachary, London, was supplied with two keys; four years later several keys were provided for the burgesses' pews at St. Margaret's, Westminster. Bishop Earle of

Exeter, in 1628, alluded to this evil practice in his description of the character of "The She Precise Hypocrite," stating that "she doubts of the Virgin Mary's salvation, and dares not saint her; but knows her own place in heaven as perfectly as the pew she has a key to."

In 1631, on May 21, Bishop Neile of Winchester issued a monition on this subject to the wardens of Elvetham, Hants: "Whereas I am given to understand that locks have lately been sett upon some pews in the parish church of Elvetham, and that without any order from me or my chancellor, which I hould very unfitt to be indured, these are to will and require you and every of you the churchwardens there, to remove all lockes upon any of the pews within the said church between this and the feast day of Pentecost next insuing."

At a somewhat later period, Pepys speaks of a practice of locking pews as a common custom: "December 25, 1661. In the morning to church where at the door of our pew I was fain to stay, because the sexton had not opened the door."

The co-religionists being locked out, the next thing was to stamp the pew as private property, the owner's initials being branded on it, as on sheep and pig. There is a record for 1550 in a London church: "Paide for wrytinge on the pewe dores at my Lorde of London's commandement, xijd." Seats with intials on them occur at Hurstpierpoint, Sussex, Slogumber, Somerset, and in nearly a hundred other cases. At North Thoresby, Lincolnshire, early in the seventeenth century, there were put up benches whose ends bear the initials of the farmers to whom they were appropriated; one has a medallion, probably of the occupier.

In this way pews or benches became private property, and were bought and sold just like any other private property. A few such instances occur before the Reformation. Thus at Yeovil, Somerset, there was a sale of seats in 1457; a seat near the pulpit fetched 16d., one near the font only 8d. In 1524 the whole of the pews at St. Christopher-le-Stocks, London, were formally reserved; twelve assessors being chosen to "appoynte to sit in every piew . . . suche persons as by their discretions shuld be thought most convenient, as well men to the piews ordeyned for men, as the Women to the piews ordeyned for Women"; the charge to be made was 2d. a quarter per person.

The letting of seats was another scandal, and, indeed, the protests of bishops and others during the sixteenth century against the increasing prostitution of devotion to luxury during the services of the Church are numerous.

The fashion of the pews of the next century called forth an indignant reproof from Bishop Corbett of Norwich (1633-6): "Stately pews are now become tabernacles with rings and curtains to them. There wants nothing but beds to hear the Word of God on; we have casements, locks and keys and cushions—I had almost said bolsters and pillows; and for these we love the church." One more protest against pews shall be cited. Sir Christopher Wren, in 1708, boldly writes:—

"A church should not be so filled with pues but that the poor may have some room in the alleys to stand and sit in; for to them equally is the Gospel preached. It is to be wished that there were no pews, but benches. But there is no stemming the tide of profit, and the advantage of the pew-keepers; especially, too, since by Pews, in the Chapels of Ease, the Minister is chiefly supported."

The big manorial or squires' pews, common from the days of Elizabeth downwards, had their origin in the usages of mediæval times. The founders of the chantries in which priests specially endowed to say Masses for the good estate of the donors while living, and for their souls after their deaths, were permitted to erect the chantry chapels as adjuncts on either side of the chancel, or forming transepts; but as time went on the chapels were oftener formed by parclose screens at the east end of the aisles, of which a few remain, as at Lavenham, Suffolk. In 1579, when chantries were abolished, the chantry space was claimed by the lord of the manor, or the family of the founder, and ere long developed into the square pew, or enclosure, in which the family could sit in state during the services of the reformed Church. The smaller squire and the lesser well-to-do, and above all the wife and family of the newly-married priest, of course, wanted to imitate the great men of the parish, and soon the smaller boxes or squared pews grew upon the rear of the big manorial pew, and monopolised the space of old free to all parishioners alike without favour.

An interesting chapter is devoted to galleries. Even before the Reformation a few galleries had already been erected beneath western towers, as at Worsted, Aylsham, and Cawston, Norfolk. Later, in some cases, the mere increase of population was responsible for their introduction; and even where the numbers of the parishioners had not increased so much, the introduction of the great square pews on the ground level had so seriously curtailed the congregational area that galleries seemed unavoidable, not only at the west end, but north and south of the nave as well. Here and there, indeed, they were put up at the east end of the nave, under or in front of the chancel arch as in St. Mary Magdalen, Taunton. Then, with flat, whitewashed ceilings put up under the open timber roofs to keep the draughts out, the interiors much resembled those of theatres, and the eighteenth century Christians had churches which suited them admirably—"close, cosy, comfortable, and stuffy, with every trace of Catholic mediævalism put out of sight." Here and there opposition was manifested. In 1606 the Mayor and Council put up a gallery for themselves in Bristol Cathedral near the pulpit, but Bishop Thornborough pulled it down, "because it made the church look like a playhouse." He was indeed obliged to reconstruct it in 1608, but he put it only three feet from the pavement, and removed the pulpit so far away that the Mayor and Corporation could not hear the sermon.

In Part II. Dr. Cox proceeds to give alphabetically brief descriptions, often illustrated, of various bench-ends in thirty-eight English counties and in Wales. There are not many in Bedfordshire, but one or two fairly noteworthy examples as at Stevington, Houghton Conquest, Eaton Socon, and Yeldon. Berks and Bucks have more, and Cambridgeshire a fair number. Cheshire has suffered the most of any English county, partly because so many of its churches were built of perishable sandstone, and partly by drastic "restoration." There is, however, a magnificent set of canopied stalls in the fine chancel of Nantwich church, currently supposed to have been removed there from the Abbey of Vale Royal. In Cornwall many of the bench-ends were of local heraldry, pertaining to such families as Arundell, Roscarrock, or Pentire; whilst initial letters, or pairs of initials, are still more frequent, all pointing to pre-Reformation appropriation of seats. Numerous and interesting are the benches and standards which remain, but restoration, much of which was carried out by an architect who was a member of a well-known local family, was destructive of nearly half the delightful woodwork of the Delectable Duchy. Portions are still to be found in public-houses, and farmhouses, serving as settees or sideboards—in one case, they were found serving as doors to a pigsty! Not a few have left Cornwall for the other side of the Atlantic. Cumberland and Westmorland were so often raided by the Scots for several centuries, that it is no wonder few pre-Reformation fittings remain. Derbyshire, remembering its small size, and that its old churches number fewer than a hundred, is well represented as regards ancient sittings. Crick certainly boasts the possession of the most exceptional remains in the county. Devonshire is rich in the number and variety of its bench-ends, chiefly of late fifteenth century or early sixteenth century date. Of the long list given alphabetically, we reproduce from those at Braunton, several of which are much mutilated, a handsome piece of fifteenth century carving in front of one of the old benches with eight arcades. At the fine old cruciform church of Holbeton there are some good modern bench-ends designed by Mr. Sedding, and illustrated in the frontispiece and on p. 85. Dorset is sparsely endowed with the remnants of ancient seating. Durham has few, but what there is includes much of interest. Essex is fairly well represented; Gloucester is by no means plentifully pre-eminent; Hampshire comparatively barren; Herefordshire has few; Hertfordshire nothing remarkable; Huntingdon fairly interesting; Kent contains much mediæval stallwork, but surprisingly few benches or bench-ends. Lancashire, in spite of the revival of so many of her churches, has a good deal of old seating of various dates. At Halsall, parts of the fine old stalls, which we illustrate, remain; good and deeply cut work towards the end of the fifteenth century. They were re-arranged at the last restoration. There are six old stalls on the south, and one on the north. They retain their ancient carved misericords. Some of the old desks remain with boldly carved fronts, and finials at the ends. One of the finials has the Stanley eagle and shield, and another a standing lion. Lincolnshire is rather rich in surviving mediæval seating; Middlesex but poorly so, restoration having bade a clean sweep of most of its old church fittings, as at Harrow, Hayes, Hillingdon, Pinner, Ruislip, and West Drayton. Monmouth lacks any traces of old work save at Abergavenny. Out of 650 old churches in Norfolk, over 110 retain traces; indeed, this county stands pre-eminent in the number and beauty of its pre-Reformation bench-ends, usually with poppy-heads. Northampton is well off, both as regards number and quality; Northumberland is almost entirely destitute. Nottinghamshire possesses an unusual number of stone bench-tables. Oxfordshire, celebrated as it is for the interest and beauty of its churches, has few ancient seatings in them. Rutland apparently does not possess a single remnant, and there are only about ten or twelve, all told, in Shropshire. Somersetshire is celebrated for the multitude of its bench-ends, often of great beauty; Suffolk only yields the palm to Norfolk in East Anglia. Surrey has little pre-Reformation work left; nor is Sussex prolific. What there is in Warwickshire is chiefly stall work in old collegiate and other churches. Wiltshire makes a poor display—there was more, but from 1840 to 1880 sad havoc was played with many of the interiors of the Wiltshire churches. Worcestershire has her fair share. Yorkshire with its vast area, has comparatively few early examples.

Wales retains a few relics of early seating in her churches; and special mention is made of a fine stall standard with carved poppy-heads in the choir of St. David's, "a cathedral which must prove of special joy to every architectural pilgrim."

An adequate bibliography, and an excellent index of places, fittingly complete one of the most interesting of the many volumes which Dr. Cox has added to a long list, each of which is indispensable to all who appreciate help of the kind available.

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DEVON AND EXETER ARCHITECTURAL SOCIETY.

ANNUAL MEETING AT EXETER.

The annual meeting of this society, which embraces Devon and Cornwall, and is in alliance with the Royal Institute of British Architects, was held on Saturday, March 31, at the Royal Clarence Hotel, Exeter. The chair was taken by the President, Mr. C. Cheverton, M.S.A., and amongst those present were Messrs. L. F. Tonar (Vice-President), J. Crooker, C. Cole, T. A. Andrews, J. Jerman, A. R. Holman, A. S. Parker, E. Coath Adams, R. A. Mill, and Allan J. Pinn (Hon. Secretary). The annual report was presented by the Hon. Secretary. This, together with the balance-sheet, was received and adopted. The President delivered his address.

PRESIDENTIAL ADDRESS.

In presenting to you the presidential address for the twenty-ninth and thirtieth years of our society it is with my deep degret to have to record that for two years past the society's work has been marred by the continuance of the terrible European war and the consequent closing down of building operations, which has affected the whole country.

It is, however, gratifying that so many of our members are serving in the Forces, and, although it is to the grief of our society that one of our members has been killed in action, it is happy to know that all the other gallant members are still spared and engaged in fighting for the achievement of final victory. My earnest hope is that the coming twelve months may see that victory accomplished and a lasting peace assured.

Although it has of necessity been a quiet period, some useful work has been accomplished, and interest in the work of the society has been, and must be, maintained.

In my opinion, the need for greater efforts to secure early registration has been clearly proven by the happenings during the past two years.

It is a matter of the greatest regret that the Registration Bill was not pushed forward with more force a few years ago. Had it been, my firm belief is that the position of architects at the present moment would have been very different and very much happier. Much of the housing and other work that has been carried out by others would have been assuredly placed in the hands of architects, and the results would possibly have been more satisfactory to all concerned.

The profession has suffered in no inconsiderable measure through possessing no recognised status, and has been ignored on every hand when it could have been of the greatest assistance to the nation's requirements at the very moment when it was most needed. We ought to secure national recognition as soon as possible.

The Royal Institute of British Architects was founded 83 years ago for the conduct and advancement of the Profession. It has the co-operation and support throughout the United Kingdom of 19 allied Architectural Societies and it is quite time the demand and more general interest and sympathy with the welfare of architects practising in the Provinces shall be taken by the Council of the R.I.BA. Greater co-operation amongst the Allied Societies and more real support from the Institute for country architects is urgently needed. The Provincial Allied Societies are the backbone of the R.I.B.A., and their needs should be considered. We look to the Institute to protect and safeguard the integrity of the profession, to promote the general interests of the members and to further the cause of architecture in every possible manner. A President of the R.I.B.A. ought to be occasionally chosen from the Provinces and every Allied Society should have continuous representation on the Council.

It is almost inconceivable to learn that the R.I.B.A. as an organised body "were strangers to the Government," and it is hoped that the Council of the Institute will act on the advice of their President who said "It must be part of our work in the future to forge the connecting link so that if ever again a like emergency should arise we should find ourselves called upon and ready to place our skill and experience at the service of the State."

My earnest hope is that the "connecting link" will be State recognition of the practice of architecture as a registered profession, and may it be strongly forged long before similar conditions to those we are passing through occur again. Much ground has been lost by the lack of initiative of our parent Institute in the past, but recently at the request of several of the Allied Societies, the Institute and the Archiects' War Committee were urged to seek official recognition, and, in consequence, a deputation representative of the architectural profession throughout the United Kingdom waited upon the Director-General of National Service to place the claims of architects before the Government and to obtain the utilisation of architects by the State in connection with the National Service Act. This deputation was favourably received, and it is to be hoped that the services of architects will be utilised throughout the country is a proper manner.

If the Institute cannot assist us to obtain National recognition, it must be up to the Allied Societies to propound some scheme whereby Provincial Architects can receive recognition by the Public as being essential and indispensable to at least all commercial enterprise in an attractive and therefore artistic manner in connection with building work.

The time has surely arrived when we could encourage public opinion to realise that Architecture is necessary for the benefit of the people; to be the means of uplifting their thoughts and emotions, and to be absolutely necessary for the carrying on of successful trading and to ensure increased happiness and contentment in the lives of our citizens. There can be no great future for the town that will not build with dignity, character and importance. The ideals of republic life and ambitions are always reflected in its public buildings. Is it too much to ask our public men to constantly bear that in mind that their work in real progressive buildings will for ever be lasting monuments and records of their labours? A town is classed as interesting or otherwise by the outward appearance of its buildings, and it is not fair to architects that buildings should be erected by persons who are incompetent and have no knowledge of what is good or bad in architecture. It is beyond me to understand why speculative builders or any other persons should be allowed to erect buildings after their own designs when architecture is such an important factor in the life and happiness of the community. We must develop public interest in all that is good and artistic in sound and perfect architecture. Appreciation of the beauty of architecture as expressed in most public buildings should be taught in the schools and the Art side of Education should be developed on architectural lines. An outline of the various orders and styles of architecture and the value and reason for the existence of the different parts of known buildings should be explained to, and interest created in the pupils.

Economy is being preached throughout the country, and it is surely an indisputable fact that it is absolutely necessary to employ the services of an architect in order to carry out building work wisely and with economy. The public should be educated to appreciate this. Several towns have set up departments of architecture in conjunction with their schools of art, which have been recognised by the R.I.B.A., and students who pass through a prescribed course of study are exampted from the R.I.B.A. intermediate examination. We should endeavour to establish similar departments in our large towns, such as Exeter, Plymouth, and Truro. Use all means in our power to promote interest in good architecture, encourage the speculative builder to appreciate the true artistic side in building work, and impress upon builders generally the necessity of building with true architectural sense.

It is to be hoped in the future that more of the public work of an architectural character at present dealt with by public officials will be carried out by architects practising in the immediate districts. It should be brought home to the officials and townsmen controlling such work that architects take more than a passing interest in the intelligent development of their localities. Mere commercialism is not the characteristic of a true architect; his love of art for art's sake prevents him looking for the end of the work and the emoluments it will bring before earnestly studying the problems and the successful working out of the scheme he may have in hand.

In conclusion, although present times are somewhat depressing to our profession, there can be little doubt that architects may look forward to brighter prospects, and may a closer bond of friendship be brought about between all of us in the near future. Let our actions be free from criticism, our interests and sympathies become mutual, and greater interest taken by all in our general affairs for the improvement and development of our profession. We shall then be happier and bound together by true friendship to maintain the integrity of our calling and become recognised by the public as men whose services are essential to the life and progress of our country.

A cordial vote of thanks was proposed by Mr. J. Jerman, seconded by Mr. A. S. Parker, for his address and able conduct in the chair during the past two years.

The following officers and council were elected for the ensuing year:—Mr. Lewis F. Tonar, Licentiate R.I.B.A., President; Messrs. A. S. Parker, F.R.I.B.A, and Sampson Hill, Vice-Presidents; Mr. S. Dobell, Hon. Treasurer; Mr. Allan J. Pinn, A.R.I.B.A., Hon. Secretary; and Messrs. A. J. Cornelius, M.S.A., R. A. Mill, Licentiate R.I.B.A., Harold Watts, A.R.I.B.A., and A. R. Holman, A.R.I.B.A., to fill vacancies on the council of those retiring, as well as those remaining in office, viz., Messrs. C. Cheverton, M.S.A., J. A. Lucas, F.R.I.B.A., J. Jerman, F.R.I.B.A., J. Crocker, F.R.I.B.A., and C. Cole, M.S.A.

The newly elected President, Mr. Lewis F. Tonar, thanked the members for the honour conferred on him, and expressed his wish to carry out his duties to the society as well as our late President had for the last two years, and also expressed his thanks to Mr. Cheverton for the great amount of time and attention he had given in the interest of the society. A vote of thanks was accorded to the Hon. Secretary, Hon. Treasurer, Hon. Auditor, and Hon. Librarian for their services. This was carried by acclamation, and replied to by the various officers. Subsequently the members lunched together, after which they proceeded to inspect St. Nicholas Priory and some of the old houses and buildings in Exeter.

A paper on wayleaves will be read to-morrow, at 6 p.m., by Mr. C. Vernier at a meeting of the Institution of Electrical Engineers. The proceedings will take place at the Institution of Civil Engineers, Great George Street, Westminster.

Sir Henry Robinson, Vice-President of the Irish Local Government Board, told a deputation last week that £100,000 would be made immediately available to enable the Dublin Corporation to carry out housing schemes in different parts of the city.

John Cruden, director, representing the Govan Entertainers, Ltd., was fined £100 at Glasgow last Wednesday for contravening the Defence of the Realm Act by carrying on the building construction of a picture palace at Govan without the permission of the Ministry of Munitions.

Mr. J. A. Gotch, J.P., of Kettering, who has been acting as military representative in the Kettering area, has been appointed a Sub-Commissioner representing the agricultural section of the National Service Department for Leicester, Northants, and Rutland. Mr. Gotch is to be succeeded in his old position by Mr. R. Burley Wallis, J.P., of Kettering.

Work upon the frieze presented by Sir Robert Maule for the new Council Chamber in Edinburgh, which has been proceeding for some months, is now complete. The frieze, which is 5 ft. in depth and is executed in the tempera medium, has for subjects the Royal arms of the Scottish Queens and Consorts, and forms a striking decorative feature. Opposite the civic stair is displayed the St. Andrew's Cross. The work has been executed by Messrs. G. Dobie and Sons, George Street, Edinburgh.

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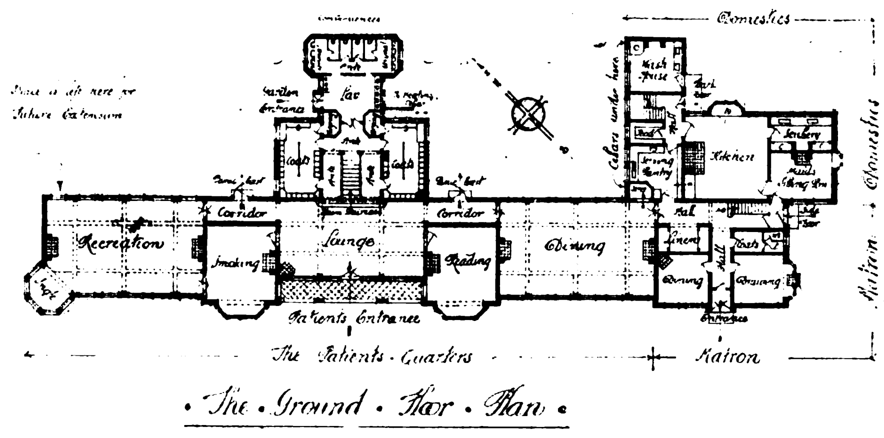

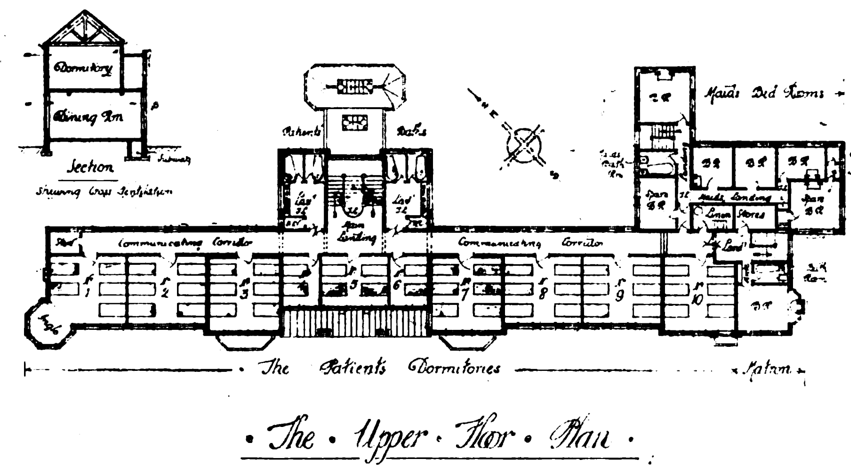

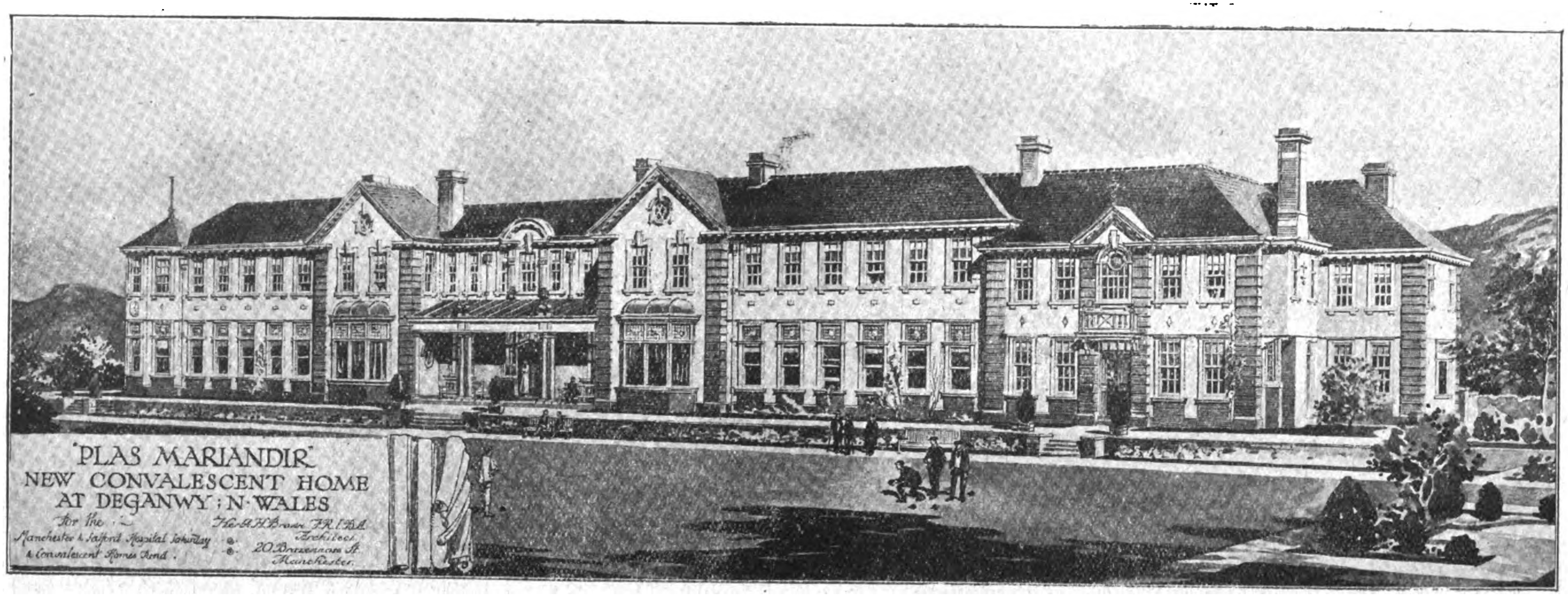

PLAS MARIANDIR, NEW CONVALESCENT HOME, DEGANWY, N. WALES.
Mr. Herbert H. Brown, F.R.I.B.A., Architect.

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Thomas Lewis, Limited, Photo.]

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Messrs. BRIGGS, WOLSTENHOLME, and THORNELY, FF.R.I.B.A., Architects.

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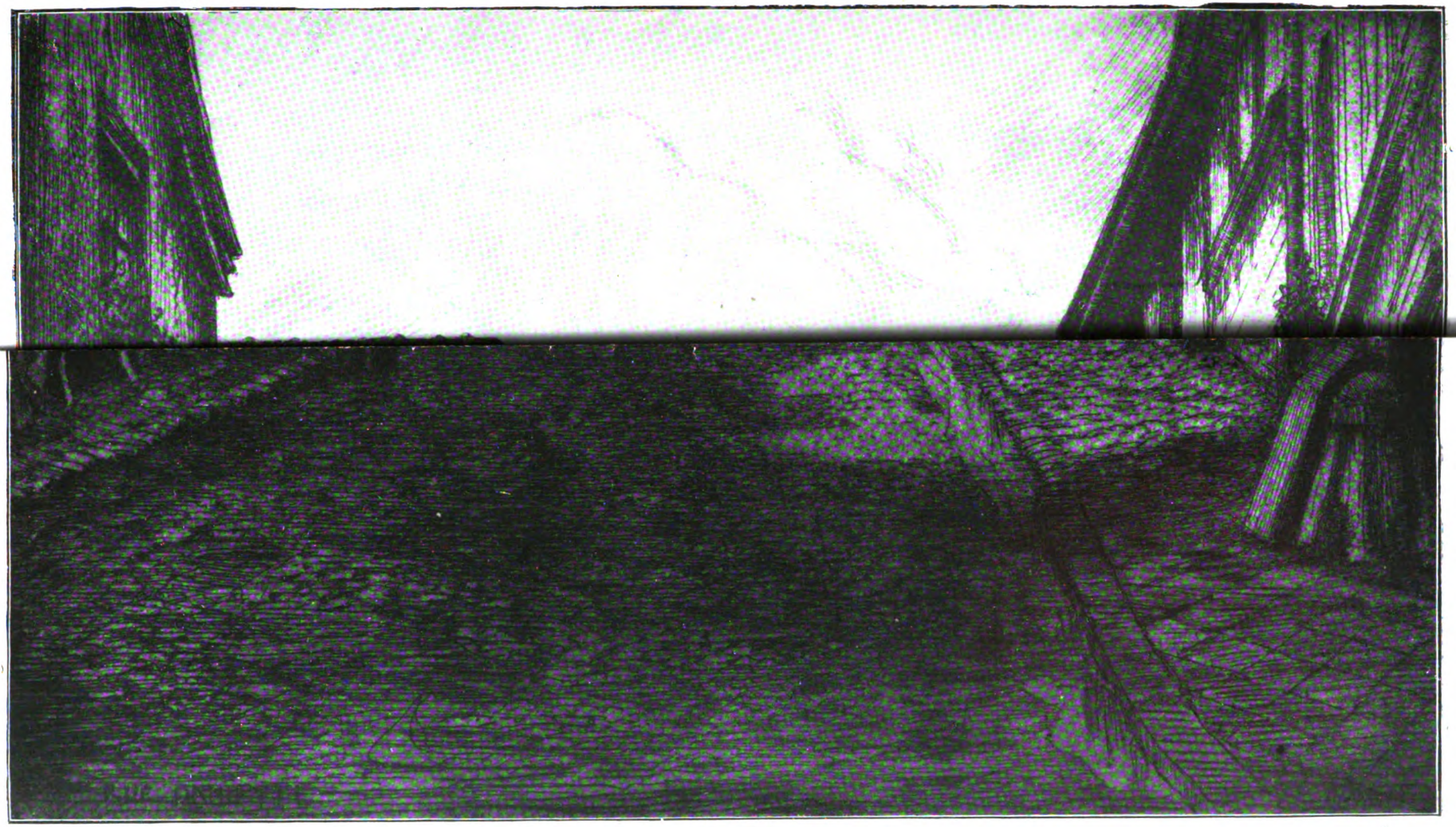

RUE DAMIETTE, ROUEN: FROM AN ETCHING BY MISS GERTRUDE HAYES, A.R.E.
(Royal Academy Winter Exhibition of Graphic Art).—By permission of Messrs. JAMES CONNELL and SONS.

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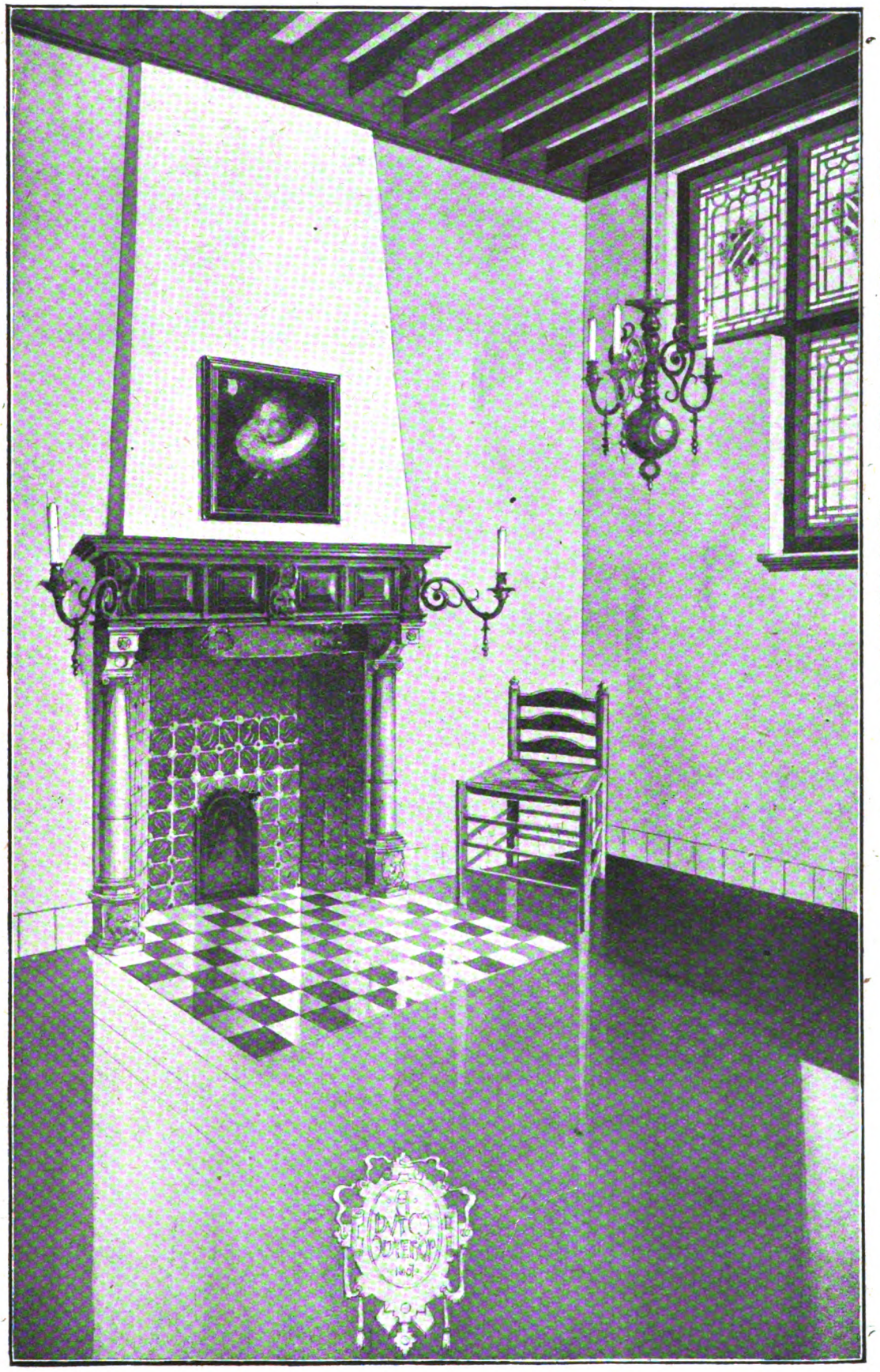

AN INTERIOR OF A DUTCH PRIVATE HOUSE IN FRANCE.
Designed by Lieut. MURRAY ADAMS-ACTON.

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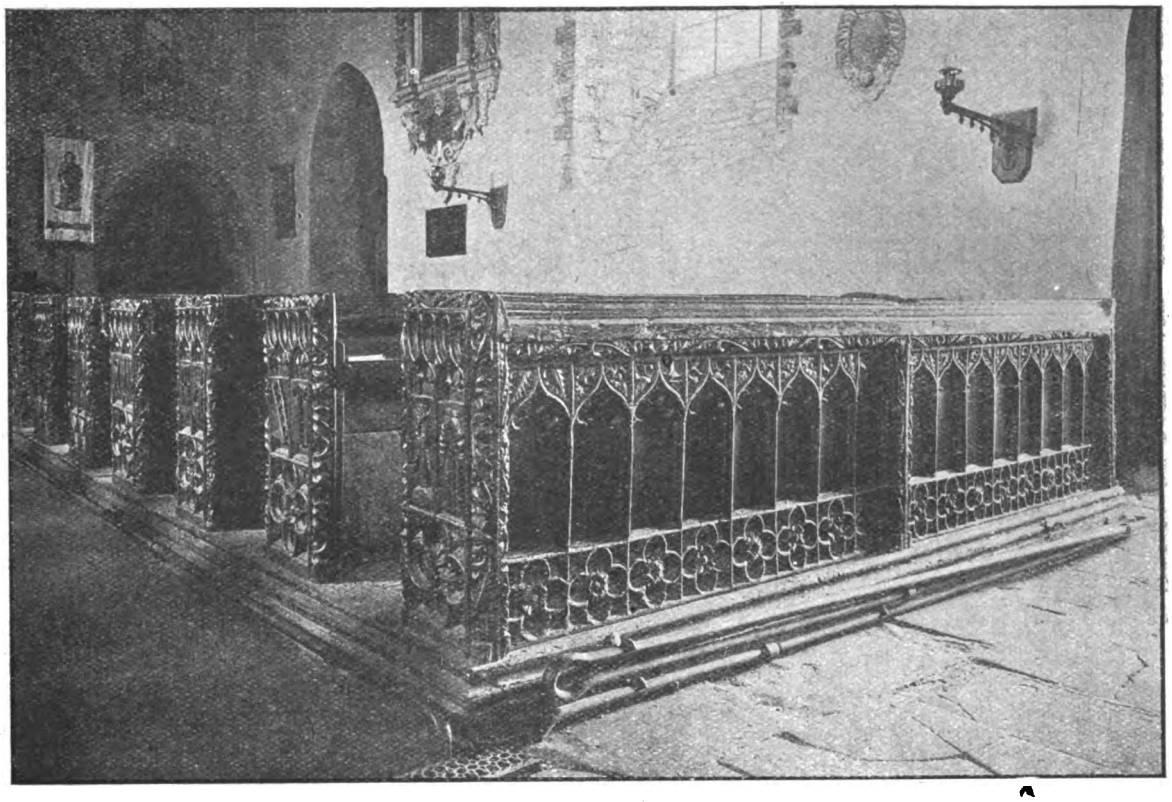
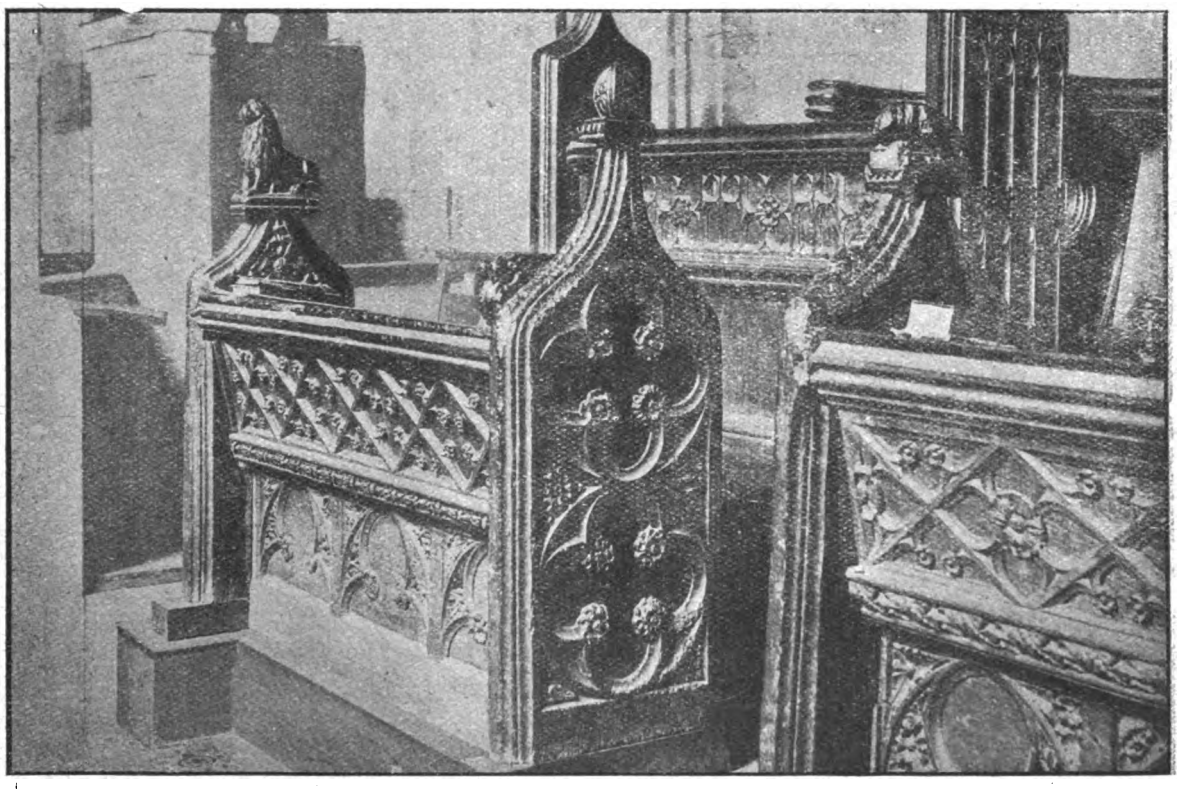


EXAMPLE FROM BRAUNTON, DEVON.



EXAMPLE FROM HALSALL, LANCASHIRE.

BENCH ENDS IN ENGLISH CHURCHES (*See page 312*).

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Our Illustrations.

RUE DAMIETTE, ROUEN.

This is one of the time-worn picturesque old streets which still here and there distinguish the beautiful city of Rouen, but the comparatively few of similar architectural character remaining in the town, such as the Rue St. Romain, are fast disappearing to make way for new buildings, wider thoroughfares and other inevitable changes. The Rue Damiette, in common with the Rue de la Republique, has St. Maclou, with its famous porch, at one end and the magnificent church of St. Ouen at the other. Before the war this delightful street was intact, as shown in this picture, and is possibly so to-day. The view which is herewith given by the courtesy of Messrs. James Connell and Sons, the eminent art publishers of Old Bond Street, Piccadilly, is reproduced from their very excellent and new etching by Miss Gertrude Hayes, A.R.E., of Rugby, to whom we are indebted for its loan. The plate was exhibited this year at the Royal Academy Winter Exhibition of Graphic Art. At the end of the vista above the gabled skyline of the Rue Damiette, with its quaint shops and queer little cafés, is seen the noble lantern of the central steeple of St. Ouen, the wonderfully elaborate 14th century church, the tower of which above the crossing is surmounted by a ducal crown of open stone traceries. The later parts of the building belong to the 16th century, and in size the fabric exceeds the dimensions of Rouen Cathedral, which ranks among the finest minsters of Europe. Like most old encircling streets set round about great ecclesiastical edifices of the Middle Ages, the Rue Damiette is cramped in scale and so narrow that for the greater part of the day the lower stages of its frontages usually remain in shadow. This enhances the pictorial effect and adds brilliancy to the sunshine seen beyond its confines, as in the present picture.

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This building has been completed, and in execution the plans have not been materially altered from the originals which we gave in our issue of June 6, 1913, when the scheme was adopted. In the meanwhile, the contract has been carried out by Messrs. Espley and Sons, builders, of Stafford. The photograph given to-day illustrates the two chief façades of the finished library, which occupies a triangular site. The structure, though relatively small, is treated in a bold, distinguished way, with the main entrance emphasised by a big-looking portico segmental on plan. Dome lights illuminate the lending department, which provides for 12,000 volumes. The news-room extends along Bailey Street. The frontage facing Lichfield Road, to the left in the view, is occupied by the magazine department. Over this is the reference library, the lecture hall being on the other flank at the first floor level. The public stairs are situated to the right of the entrance vestibule. The borrowers' hall is placed in front of the main central doorway. White Hollington stone is employed for the masonry and dressings. Portland cement concrete floors are used covered with linoleum. Black and white marble paving has been laid in the entrance hall. The facings to the wallings are of 2 in. wire cut bricks of quiet colour. Messrs. Briggs, Wolstenholme and Thornely, FF.R.I.B.A., of Liverpool, are the architects.

AN INTERIOR OF A PRIVATE HOUSE IN FRANCE.

Lieutenant Murray Adams-Acton's scheme, herewith illustrated from his own water-colour perspective, is, we understand, intended for a private residence in France, as designed before the war, when he was living in Paris. The sketch shows a small hall handled in a Dutch manner, with a hooded chimney-piece and wooden mantel having brass sconces for candles fixed on either hand. The surrounds of the grate are fitted with old Dutch tiles. In the absence of the designer, who is on military service abroad with the Scots Guards, we are unable to give further particulars.

"PLAS MARIANDIR," NEW CONVALESCENT HOME, DEGANWY, NORTH WALES.

The accompanying plans and sketch show the new convalescent home which is being erected for men by the Manchester and Salford Hospital Saturday and Convalescent Homes Fund, under the superintendence of Herbt. H. Brown, F.R.I.B.A., F.M.S.A., architect, of No. 20, Brazenose Street, Manchester. For some years this Fund has rented a large residence at Penmaenmawr as a temporary home for men. This met with such remarkable success and appreciation that it was very soon found to be too small for the demands which were made upon it. The committee decided to erect a new home, and a suitable site of three acres at Deganwy was settled on. It commands an uninterrupted view, on the high ground, of the Penmaenmawr Range, the Straits, Puffin Island, and other lovely scenery looking over Llandudno, Rhos-on-Sea, etc. Building operations were well in hand when the war broke out, so for the present only the matron's and domestic quarters are allowed to be completed, and the shell of the patients' quarters covered in so as to save the work which had been commenced from being wrecked by gales on so exposed a site. The majority of the inmates of the present temporary home are older men engaged in war work in the various engineering works, etc., of the Manchester district, who are temporarily broken down in health and require quiet rest. The front of the building faces south-west and looks on to a large bowling green and garden. The planning constitutes a new model for a convalescent home in many ways, cross ventilation and ample lighting being the principal features not only on the ground floor of the patients' rooms, but to all the ten dormitories on the upper floor, by means of a low, flat roof being formed over the 5-ft. wide communicating corridor, which permits of good cross ventilating windows over to all the dormitories. The offices are planned well at the rear, and a separate sewage system is arranged upon the site. The matron's rooms command full control of all departments, both inside and outside. The domestics' quarters are at the rear at one end, planned in such a manner as to avoid any smell of cooking from penetrating, and so that they cannot be overlooked. The walls are built of bricks covered with stucco all around, roofs are covered with dark brindled Shropshire tiles, the floors are reinforced concrete, for the greater part covered with wood blocks or jointless floor finish. The general contractors are Messrs. J. H. Billings and Co., of 59, Sackville Street, Manchester.

BENCH ENDS IN ENGLISH CHURCHES.

These two examples, taken from Braunton, Devonshire, and Halsall, Lancashire, are referred to in our review of Dr. J. Charles Cox's book on "Bench Ends in English Churches," on p. 312.

POLAND AND POLISH ART.

Poland was almost the last of the European nations to come forth into the hierarchy of art. Her culture is indeed very ancient, but she did not develop a national art before the middle of the nineteenth century. The Polish kings and nobles loved art and received foreign artists of fame with open arms. To this day the old Polish towns of Gnesen, Posen, and Krakow harbour mediæval and Renaissance masterpieces; but the country's own achievements were a rustic product "rooted in the soil of the fatherland with its sturdy farmers as its main cultivators." The case of Poland as an art-producer is treated in a special number of the war-series of *L'Art et l'Artiste* (Paris), and one of the contributors, C. de Danilowicz, gives a hint of explanation of the situation in quoting the words of the great Polish poet, Borodzinski, that "Poland has been for centuries the wall behind which Europe has built up its civilisation, sheltered against the invasions of the Tatars." Occupied with continuous warfare, and finally overwhelmed with the inner dissolution of the commonwealth, the muses had no chance. In the fifteenth and sixteenth centuries Gothic and Italian art fought for supremacy. The Renaissance spirit finally triumphed over the Teutonic; but not without a struggle, for the rich merchants of Krakow were nearly all Germans, and King Casimir himself, whose wife was an Austrian archduchess, surrounded himself with German artists. "There was no exaggeration in the dictum that the capital of the Polish kings of the sixteenth century resembled rather a suburb of Nuremberg than a centre of Slavic culture." When King Sigismund I. in 1578 married a Milanese princess the tide of art-influence began to flow from Italy. There was, however, a national art maintaining itself in the hearts of the people:

"While the Polish warriors fought the battles of freedom on all the battlefields of Europe, the farmer and artisan, the woman and maiden, created and nurtured the artistic sense of the people through the loving care with which they built their houses, manufactured and embellished their modest household furniture, their implements of labour, their quaint national costumes. We can now trace the genealogy of art to prehistoric man, and in many regards rustic art is related to the naïve artistic efforts of our far-distant ancestors.

"Most developed is the artistic instinct among the mountaineers of the Tatra, a range of the Karpathians, and the farmhouses of Zakopane served our modern artists as models in villa-building. Of a peculiar ethnographic interest is a door ornament representing the rising sun. Sometimes the paschal lamb is represented. The central piece of the artistic house-furniture is the heavy table, often bearing the date of its completion. The table, as a kind of house-altar, plays a great part in the folk-lore of this mountain people. Not only every piece of crockery, every fork, spoon, and knife bears exquisite ornaments, but also the very trunks, containing the linen and costumes of the family and occupying a cosy corner of the room, are richly painted.

"Curiously enough, and pointing to a common basis of human art, we find the same motives in the rustic art of France, but while here the invasion of modern industry has arrested the development, the conservative Polish farmers of the Karpathians held to the traditions of the past with a kind of religio-national fanaticism.

"Polish architects modelled their villas in the beautifully situated watering-place of Zakopane after the artistically constructed farmhouses. Sculptors and engravers went to the same native art-school and the gold- and silversmiths drew likewise their inspiration from the products of popular art. Even the famous porcelain factory of Sèvres produced, at the occasion of the Paris Exhibition of 1900, a Tatra service according to the model furnished by Stanislas Witkiewicz."

So good is the native Polish art that the writer suggests to the French toy-merchants and manufacturers to replace the cheap Nuremberg products by the more artistic Polish models, which, curiously enough, remind us often of the Japanese dolls. We obtain, at the same time, the historically interesting bit of information that it was none other than the great French statesman and financier, Jean Baptiste Colbert (1619-1683), who introduced the German toy into France.

Of great artistic interest, too, so we are assured, are the old wooden churches—often dating as far back as the eleventh and twelfth centuries—and the beautiful town houses of the Polish burghers. We further learn of an institution which should arrest the attention of all lovers of art—the establishment of art-schools in the country, in the midst of the wild scenes of nature.

"What will remain of all this rustic Polish art when the present war will be over? Old castles and beautiful farmhouses, cathedrals, and village churches have been razed and burned without pity. Fortunately, a few ethnographical museums still survive, and thus a restoration of the national art will be facilitated. The Polish people did not forget its national songs and dances, its national tongue; neither will it forsake its indigenous art."

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CONCRETE AND REINFORCED CONCRETE.*

By A. H. RHETT, Assoc. M. Am. Soc. C. E.

Reduced to its most practical form, the question becomes merely whether or not concrete can be made non-porous; and, if so, what is the simplest, most effective, and cheapest method of doing it.

The first step in this direction should be, and is, the proper proportioning of the ingredients to fit so closely and compactly that no voids remain, and much experiment and investigation has been done along these lines. Repeated experiment, however, has seemed to show that, with the best possible grading, tamping, and mixing with available aggregates, there still remains from 10 to 15 per cent. of voids, while there is also an added percentage due to pocketing of water or air during the mixing and placing process.

It is not essential, of course, to close every void to render the concrete water-proof, as far as percolation through it is concerned, because continuity of the voids will play a considerable part in any percolation; but the rendering of the concrete absolutely non-porous is desirable sometimes for other reasons. The entrance into the pores of water affected with acid or alkaline properties gives rise to disintegration of the concrete, from the reaction of the acid or alkali and the free lime always present, and the preservation of the integrity of the concrete is more important than the actual water-proofing of it. Furthermore, any such reaction would eventually render the concrete pervious, even if it were not so originally.

The problem, then, in its final form, becomes one of closing this 10 to 15 per cent. of voids that remain after the best proportioning has been obtained and those that occur from the pocketing of water or air in the concrete during the mixing process, or from friction between the particles of the aggregates in placing; and a corrective must be sought in means other than proportioning.

A study of the hydration of Portland cement seems to show that such a correction lies latent in the cement itself, and can be made available under proper treatment.

It has been shown† that the so-called beta-orthosilicate element of Portland cement is very slow to hydrate, and that but little trace of its hydration is found in any cement before seven days, and in some cases it does not appear until 28 days, but that when this hydration does commence it progresses as long as water is present, and with a great increase in volume. This increase in the volume of Portland cement when continually mixed with water has been also strikingly shown by Nathan C. Johnson,‡ Assoc. M. Am. Soc. C.E.

This action of the cement, of course, must occur in concrete where the mixing is thorough and when water is held in the mix long enough to permit it. A further point to note is that chemical action of this sort is retarded by pressure, and would be most active in the direction of least resistance and consequently into the void spaces. It is also an interesting fact that this beta-orthosilicate element hydrates with an amorphous and not a crystalline structure. If the latter were the case, there would be a tendency to disrupt the concrete, but the amorphous texture of the increased volume enables it to adjust itself to the void forms and fill them.

It is a well-known fact in daily practice, and has recently been again noted,§ that, with a given mix, the strength, and therefore density, will vary directly with the length of time required to dry out.

It would seem entirely possible, therefore, theoretically to get a non-porous concrete:

1. If the aggregates were properly proportioned.
2. If the mixing were thorough;
3. If the placing and tamping were properly done;
4. If the quantity of water used were correct; and
5. If the forms were kept on long enough to insure the retention of sufficient water to hydrate the cement thoroughly.

Any practical man knows the difficulty and expense, if not the impossibility, of obtaining these conditions, and it becomes a very practical question as to whether or not they might not be obtained by a less expensive and more automatic or fool-proof method.

Answer to this question has been sought in the so-called integral water-proofing compounds, and they have been produced on several theories.

The simplest was the addition of some very finely particled inert material that would fill the voids. There seems to be no reason to doubt that the addition of such material might, to a certain degree, compensate for a faulty proportion of aggregates, but could scarcely be relied on to fill such voids as are caused by the mechanical pocketing of air and water in the concrete during mixing, or by the friction of the particles in placing.

Another theory has been to mix with the concrete a water-repellent material that will coat the voids and pores and prevent absorption. It is difficult to see, though, how such a material could coat the pores without coating also the particles of cement and preventing proper hydration, or how it could be relied on to coat every pore.

A better and more rational theory, however, has been to add a material which will lubricate the aggregates, and thus enable them to settle in a denser mass by eliminating the friction, and which will also act as an inert void filler. Such a material would eliminate the necessity for much tamping, and would compensate to a certain degree for a faulty proportion of aggregates; but there would probably still remain a certain percentage of voids due to the air and water pockets formed in the mixing. These, it would seem, can really only be eliminated by the swelling action caused by the full hydration of the cement, as described previously.

If, however, a material could be added to the concrete that would not only act as a lubricator and void filler, but, in addition, would tend to hold the water in the concrete and prevent too quick drying, it would certainly seem—on perfectly rational grounds—to compensate to a considerable degree for faulty proportioning, careless placing and tamping, inadequate mixing, and early removal of forms.

Such action, moreover, would be automatic, and might well prove much less expensive and more practical than the conditions necessary to obtain the same result without the addition of the compound.

The object of this discussion has been to show, if possible, that there is a theory which is rational and will explain the success that has attended the use of some of these compounds, in so many instances, and that the practical evidence of their effectiveness cannot be candidly disregarded.

To obtain this success, these materials should be used intelligently. There is nothing miraculous about their action. They cannot compensate for cracking or breaking of the concrete, for very lean mixes, or for an acid or alkaline content in the sand, but they can and do compensate, to a degree which is eminently practical, for faulty proportioning, careless placing and tamping, improper mixing, and too quick removal of the forms.

* Presented to the Annual Meeting of the American Society of Civil Engineers, January 17, 1917.

† *Technologic Paper No. 43*, U.S. Bureau of Standards.

‡ "Materials v. Methods—Testimony of Moving Pictures in the Study of Concrete," *Engineering Record*, December 4, 1915.

§ "The Strength and Other Properties of Concrete as Affected by Materials and Methods of Preparation," *Technologic Paper, No. 58*, U.S. Bureau of Standards.

A fine of £100 was imposed last Wednesday upon the director of a Govan entertainments company for proceeding with the erection of a picture house when the necessary licence had been refused by the Ministry of Munitions.

A site of about 7,000 square ft. at the south-east of Piccadilly Circus, adjoining the Criterion Theatre and Restaurant, is shortly to be let on building lease by the Commissioners of Woods and Forests. The property has a frontage of 73 ft. to Piccadilly Circus and 112 ft. to Regent Street, with a third frontage to Jermyn Street. Rebuilding will, of course, not be permitted until after the war.

WATER SUPPLY WORK IN WESTERN AUSTRALIA.*

THE COOLGARDIE WATER-SUPPLY, WESTERN AUSTRALIA.

By P. V. O'BRIEN, M.Inst.C.E., and J. PARR, B.Sc., Assoc. M.Inst.C.E.

The construction of the Coolgardie waterworks was described by Mr. C. S. R. Palmer in a paper read before the Institution in 1905, and the object of the present paper is to review the works to date.

The water pumped at the first pumping-station has increased from a little under one million gallons per day for the year 1903 to 3,300,000 gallons per day during the past two or three years. Of this quantity about one-fifth is accounted for in the agricultural areas traversed by the main, and four-fifths in the mining areas, but only three-fifths reaches Kalgoorlie. The total length of branch and reticulation mains now laid in the goldfields district is about 236 miles, and in the agricultural areas about 628 miles.

To minimise corrosion the water has been treated with lime since 1910, and additional tanks have been erected at several summits to keep the main full of water. Additional storage tanks have also been provided at pumping-station No. 5, and at Kalgoorlie, and arrangements are now in hand to de-aerate the water before it enters the main.

The Reservoir.—There has been at all times an ample supply of water available in the reservoir.

The principal substances in solution in the water are the chlorides of sodium and magnesium. The salinity increases each year from September to June, and falls more or less during July and August, according to the quantity of water flowing into the reservoir. A series of dry years naturally increases the salinity. The lowest salinity was recorded in October, 1905, viz., 4 parts of chlorine per 100,000, equivalent to 4.6 grains of sodium chloride per gallon, and the highest in January, 1915, 30.2 parts chlorine per 100,000, or 35 grains of sodium chloride per gallon.

The Weir.—The wall generally is in good condition and the seepage through it is slight. Three bore-holes sunk in the wall in 1914 showed a general slow infiltration of water through the wall and comparatively free flows at certain levels corresponding with horizontal lines of seepage on the down-stream face. Under such conditions the upward water pressure in the wall must be taken into consideration in estimating the stability.

The Pipe-Line.—The lead joints have generally given good results, but in a few cases the frequent re-caulking of weak joints has caused rapid local internal corrosion and has rendered the removal of the pipes necessary.

The locking-bar joints have stood well, and only in one case has a bar failed.

In 1905 a leak occurred through external pitting, and since then there has been a gradual increase in the number of such holes each year. Wherever they occur the pipes are uncovered and supported on timbers clear of the earth. They are left open, and are found to keep generally in good condition at moderate cost.

The original bituminous mixture on the exterior of the pipes underground has practically all perished, but where the pipes are above ground it (and consequently also the pipes) shows very little depreciation. Where the pipes were laid underground in gravel or sand they show slight rusting only, but in loamy and clay country, which is generally salt, a considerable amount of pitting and scaling has been found.

The carrying-capacity of the various sections of the main decreased for a number of years, till it reached limits ranging from 33 per cent. to 60 per cent. below the original capacity; since then it has remained practically constant. In consequence of the lime treatment of the water, a deposit, chiefly of carbonate of lime, has taken place in the

* Abstract of papers read at the ordinary meeting of the Institution of Civil Engineers on Tuesday, the 3rd April, 1917.

main, ranging in thickness from about ⅝ inch at Mundaring to traces only at Kalgoorlie.

Nodules of rust have been found on almost every pipe examined, and, without exception, they are more numerous on one side of the pipe than on the other. The side carrying the most nodules is apparently the side which was most exposed to the sun whilst the pipes lay on the ground before being laid, and has no connection with the present position of the pipe or the thickness of the bituminous coating. The nodules vary in number up to 90 per square foot on the worst pipes. The height of the largest nodule on the pipes was found to be 1½ inch.

The coating was found to have perished and to be porous to a depth of 7-64 in., but beyond that it was in good order. The formation of the nodules appears to arise from cracks in the bituminous coating rather than from the gradual decay of the coating, for a close connection is apparent between the condition of the pipes and the severity of their exposure before being laid, whilst at the same time every pipe shows areas without nodules where the coating is thin and must have perished years ago.

Under every nodule there is a corresponding pit. As a general rule, a few pittings up to ⅛ in. deep were found in the pipes wherever an inspection was made. In a few cases pipes were found practically free from pitting, whilst in a few others pittings over ⅛ in. and up to ¼ in. deep were found. Where the pittings were ¼ in. deep they were isolated, about ½ in. in diameter, and surrounded with metal of the full original thickness and carrying mill-scale.

Corrosion.—Pitting starts wherever the water gets access to the steel and an adjoining layer of scale—thereby constituting a galvanic battery—and the depth of the pit will depend on the time taken to separate the piece of scale from the plate, and thus destroy the element. Large areas of mill-scale and punctures in a thick bituminous coating are conditions highly favourable to deep pitting. The corrosive quality of the water appears to be due chiefly to its dissolved oxygen and carbon-dioxide. The variations in the quantities of the salts found in the water make no appreciable difference in the corrosive quality. As the water passes along the main it loses over two-thirds of its dissolved oxygen and shows decreasing corrosive activity.

Life of the Main.—This will probably be determined either by leaks due to internal corrosion or by external corrosion close to the lead joints. The worst internally corroded pipe so far discovered shows a reduction in thickness along a strip 4 ins. wide and the full length of the pipe, amounting to about 0.007 in. per annum. Such a pipe would probably have a further life of about ten years under similar conditions. By de-aerating the water, in addition to treating with lime, internal corrosion can probably be reduced.

The capacity of the main between pumping-station No. 4 and Kalgoorlie appears likely to meet all requirements for many years, but between stations Nos. 2 and 4 the quantity of water to be pumped is increasing every year, and it will probably be necessary in a few years to improve the capacities of these sections by overhauling some of the pipes or laying new ones.

The Pumping Plants.—On account of the increase in the friction in the main it has been necessary to reduce the sizes of the plungers at several of the pumping-stations, and the capacity of the pumps has been reduced accordingly from six million gallons per day to four millions.

The cost of pumping, including wages, salaries, fuel, oil, etc., repairs, renewals, alterations and maintenance of buildings and quarters is 0.27d. per 1,000 gallons lifted 100 feet—equivalent to 0.57d. per effective or pump horse-power-hour. Taking the total quantity of fuel burned in the boilers for the past twelve months, the working duty of the plants is about 90 per cent. of that guaranteed.

The whole of the pumping-plants have kept in good order and have suffered only the usual wear and tear, requiring only minor repairs.

WATER-SUPPLY IN THE INTERIOR OF WESTERN AUSTRALIA.

By P. V. O'BRIEN, M.INST.C.E.

Physiographically West Australia is divided into three districts, namely, the Coastal Plain, the Coastal Ranges, and the Plateau of the Interior, and geographically into six divisions, the aggregate area of which is 976,000 square miles. Temperatures vary with the distance from the coast, with latitude to some extent, and also with the prevailing winds. Generally the inland plateau is intensely hot in summer and cool in winter. The atmosphere is dry, the evaporation great, and the rainfall very low.

Rivers in the north-west of the State carry water only after heavy tropical rains, and then for a short period only. With the exception of the extreme south-west division, no perennial streams or fresh-water lakes exist.

Scattered over the interior are numerous salt lakes ranging in area from a few acres to 1,000 square miles. There is little doubt that these chains of salt lakes were at one time flowing rivers, but have altered owing to the rising of the land and the change of climate.

The mineral belts, chiefly auriferous, stretch from the south coast, with a few breaks, to the northern or Kimberley division. A great many mineral finds were made in the early 'nineties, and a large influx of population occurred. Many finds have also been made since the great gold rush, and there is little doubt that many more will be made in the future.

The rush of population mentioned above resulted in hundreds of mining camps springing up, many of which grew rapidly into prosperous towns. These, with the scores of smaller townships, are supplied with fresh water, and ore-treatment plants on mines are supplied with salt or fresh water, or both. Roads, railways, and stock-routes followed settlement, and water supplies were generally kept ahead of settlement.

Artesian basins exist, but do not extend to the interior. Therefore, other sources of supply were looked for and found in subterranean water at depths varying up to 200 feet, and in conservation of rain-water.

Over the greater part of the central division the ground water is salt. During the first few years of the gold rush this water, being the only kind procurable, was distilled and sold at 4d. per gallon. No distillation has been necessary since 1900.

Salt Water Wells.—Salt water is used in ore crushing and for other purposes on mines. Heavy flows cannot always be found just where required, and in such cases it has been necessary to pump from various distances up to eighteen miles from the source of supply to the mines.

Fresh-water Wells.—North of South latitude 29° fresh subterranean water may generally be found. Hand percussion boring plants are used to find water, whether fresh or salt. Boring costs 5s. to 6s. per foot, including transport charges and mens' time travelling.

Wells are sunk along roads and stock routes, and provided with windmill equipment, when they supply small town sites.

In areas where fresh subterranean water is found towns and mines are supplied from groups of wells by pumping. The towns are reticulated and the house services are metered.

Charges for water range from 3s. to 7s. 6d. per 1,000 gallons for salt water, and 4s. to 7s. 6d. for fresh water.

Catchment Areas.—Over the Central and part of the Eucla division, from about South latitude 29° to the Southern ocean, the subterranean water is salt. Fresh water is obtained by conservation of rain-water.

Distributed over the granitic portions of these divisions are large granite outcrops, ranging in area up to 300 acres, and in altitude to 150 ft. above the surrounding plain. These rocks form excellent catchments for tanks. Masonry-in-cement drains are built round the rocks, and the run-off intercepted by these drains is led by carrier races to the reservoirs. Of the first inch of rain falling on rock catchments 95 per cent. has been impounded, and from rains following 100 per cent.

Catchments other than rock generally consist of gently sloping country, with surface of clayey loam, granitic sand, with stony patches, etc., the whole more or less covered with timber and scrub. The natural vegetation on catchments is preserved, as its destruction would result in the discharged water becoming salt.

The yield of each rainfall depends on the intensity of the fall on each acre of catchment, the duration of the fall, the length of dry period before the rain, and whether it falls during the hot or the cool season.

The yield from a catchment area may be greatly increased by making a network of furrows, or small drains, to lead the water quickly into the main channels. Money is well spent on such work.

Reservoirs, known locally as tanks and dams, are divided into six classes:—

(a) Excavated tanks in watertight ground;
(b) Tanks made to hold water above the natural surface of the ground;
(c) Excavated tanks, clay-pug lined;
(d) Concrete-lined excavated tanks;
(e) Asphalt-lined tanks;
(f) Iron tanks with artificial catchments.

The method of construction of these various tanks is described in detail in the paper and illustrated by examples.

Roofed Reservoirs.—In building reservoirs or tanks in a dry climate an allowance should be made for evaporation in reckoning the capacity, or evaporation should be prevented. It has been proved in the Central Division that roofing pays better than adding to the capacity. Tables attached to the paper show the evaporation outside the reservoir at Menzies during 1910 to have been 151.93 in., and the loss by evaporation from the covered tank as 2½ in. The water saved paid for the roof in a short period.

The paper concludes with descriptions of the water supplies in five of the principal towns in the interior. The capital costs range from £22,000 to £53,000.

Generally, these works provide salt water from wells and fresh water (conserved) for mines and towns. In most cases the two kinds of water are pumped through the same pipes, and in other cases three waters are similarly delivered. The power used is from either gas or Diesel engines—the fuel in the former case being producer-gas made from charcoal, and latterly from wood.

PEWS IN CHURCHES.

In connection with our review on another page of Dr. Cox's book on "Bench Ends in Churches," the following extract from Mr. Philip Norman's paper on the "Church of St. Michael, Cornhill," in the recently issued Part I. of Vol. VIII. of the "Transactions of the St. Paul's Ecclesiological Society" may interest.

In the parish accounts of St. Peter's, Cheap, for 1447, there is mention of a pew "next the chirche door." In the accounts of St. Stephen's, Walbrook, for 1474, a payment is recorded for cleaning the pews. In the year 1457 a very curious direction was drawn up, with the consent of the whole parish of St. Mary, Woolchurch Haw. It states that the churchwardens shall, by authority of the Mayor of London, granted in the Guild Hall, "set both ryche and pore yn the sayd chyrche in ther pews yt longythe," *i.e.*, that belong or are set apart for them. In his paper on the church of St. Mary at Hill, the present writer has noted the existence of pews there in the latter part of the fifteenth century; they were closed, and their floors were strewn with rushes. The church of St. Andrew, Undershaft, rebuilt between the years 1520 and 1532, was then pewed, in part at least.

It has been said (by Bacon) of Sir Thomas More, that when he was Lord Chancellor "he did use, at mass, to sit in the chancel and his lady in a pew." At the church of St. Christopher le Stocks, in 1523, the pews were all numbered and priced, the prices varying according to their nearness to the east end. John Bale, who was zealous against the Roman Catholics, in his "Image of Bothe Churches" (1550), speaks of their "abbeys, chapels, and chambers, shrines, images, church stools, and all pews that are well paid

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for." Even as early as the year 1287, at the Synod held at Exeter under Bishop Quivil, it was enacted that in consequence of the frequent quarrels of parishioners about their seats, no one should call any seat in the church his own save noblemen and patrons.

From these and many other existing records we may learn that pews and private seats in churches were not invented by the Protestants, as is sometimes erroneously said. It would seem that the custom of having particular seats was originally confined to patrons, founders of chantries, and other influential people, and that it gradually spread; but the high enclosures, covering almost the whole area of the church, with which in our youth we were many of us familiar, no doubt came into vogue some time after the Reformation.

LONDON COUNTY SCHOOL BUILDINGS.

On page 227 of our issue of March 14 we gave fully the details of the report of the L.C.C. Education Committee with regard to the proposed economies in elementary school building within the Council's area. The scheme was adopted at the Council meeting yesterday week, and a model school on the new system is to be erected at Greenwich.

Most of the proposed saving will be due to the revised planning which has been adopted.

The "drop" system, while being a more economical form of heating, is quite as satisfactory as the system previously adopted.

The Fletton brickwork proposed is reliable, and, when faced externally with stock and special bricks, will prove quite satisfactory. Fletton brickwork is customarily used in buildings of this description.

Ornamental brick cornices, owing to their projection, are found to be detrimental to the durability of the building. The plans prepared by the architect will not in any way impair the dignity of the building.

The reduction of the thickness of the concrete in the floors of class-roms, halls, and corridors, and the topping of the reduced layer of concrete with coke breeze concrete, will render the proposed plain flooring stronger and more solid.

The original scheme provided for stone dressings to the entrances, but these are unnecessary.

The architect advises that steel and concrete landings are equally as satisfactory as York stone landings.

The Council considered as to the use of Bangor or Delabole slating as alternatives to Westmorland slating, and came to the conclusion that Delabole slating should be used, although the saving would be about £30 less than if Bangor slating were used. It was advised that Delabole slating is considerably more durable than Bangor slating.

The use of lines and pulleys for windows in lieu of rod window gearing is found to be satisfactory.

The Council gave special attention to the question of the provision of glazed dadoes for class-rooms, halls, staircases, and corridors, and came to the conclusion, in view of the general appearance, sanitation, cleanliness, and the very small cost of annual maintenance, that glazed dadoes should be provided, the brickwork above to be fair faced and distempered.

The reduced cost of building will effect a reduction in the fees payable to quantity surveyors. The architect has also submitted a list of some 30 small items in which further savings will be possible.

This standard plan will enable schools to be built at a cost of £11 4s. 9d. per head, as compared with £15 15s., showing a net reduction of £4 10s. 3d. per head, equivalent to a reduction of £4,045 on a standard school of 896 places.

At a meeting of Newcastle Town Moor and Parks Committee a deputation from Newcastle Infirmary Committee attended and asked for about 14½ acres of ground for extensions, and the committee agreed to recommend the city council to give the freehold of the necessary land, subject to the Stewards Committee of the Freemen giving up their herbage rights.

CLAY PRODUCTS IN ENGINEERING CONSTRUCTION.

By E. H. Darling.*

Clay products perform many important services in all the various fields of constructive engineering. Their uses may not be as spectacular as those of some materials, but they are none the less most valuable. Clay, when properly treated, is a very poor conductor of heat and electricity, and very inert to chemical action, and most of its value in construction is due to these properties. The fact that it is a common material, widely distributed and found in a natural state, is because it is a stable chemical combination under all natural conditions of atmosphere and climate. When baked, burned, or fused, it undergoes certain changes which tend to make it even more stable or inert to deteriorating chemical forces. All such other materials, as the metals which are obtained by tearing them from the rocks by intense heat, or such as timber, which is built up by organic life, while stronger, harder, and more elastic than clay products, are not as stable, and they always have a strong tendency to return to their original state—to rust, decay, soften, and disintegrate.

CLAY PRODUCTS SOLVE DIFFICULTIES.

It is not a difficult matter to design a retaining wall, assuming certain conditions of foundation and backing, yet probably, with the exception of dams, there is no class of engineering structure that has a larger percentage of failure than retaining walls. It requires better judgment—the outcome of experience—to so drain away the water which is likely to collect and alter the assumed conditions than it does to design the wall. The same thing applies to road building and to foundations in general. The electrical engineer would have no difficulty in high voltage transmission were it not for the problem of insulation. It would not be difficult to heat a building were the exterior walls perfect non-conductors of heat. All large sewers might be easily built of concrete, were it not for the fact that certain kinds of sewage disintegrates Portland cement. All the study and thought put into the steel framework of a skyscraper is rendered worthless in a few minutes if there has been carelessness in protecting it from fire. All these problems and many more like them, which in a sense may be called the finer problems of engineering, depend on clay products in the form of drain tile, insulators, brick, glazed tile, hollow tile, etc., for their solution. We use clay products for permanent construction, and where strength is essential we build a framework or skeleton of wood and steel, and protect them by a covering of the more durable material. It must be remembered, however, that what is true of clay applies more or less to certain other products of the earth, such as Portland cement, asbestos, mica, slate, etc., which also have their place in construction.

But while clay products thus perform many services in construction, the end has by no means been reached. There is room for improvement in the way they are utilised; there are doubtless new uses to which they could be put, and, besides, the demand for their use could be greatly increased. The following brief discussion will offer, from an engineering standpoint, a few suggestions along these lines.

BRICK INEFFICIENTLY USED.

The clay brick is one of the oldest forms of building material, and one would think that it must have long since reached its highest possible efficiency. But common brickwork, as used to-day, when required to carry great loads, must be classed as a very inefficient material. Good, well-burned brick has an average ultimate compressive strength of about 130 tons per square foot, but when it is laid in lime mortar in the usual way the average strength of the combination is not more than half of this (70 tons). Here is a waste of 50 per cent. of the strength of the brick. It is only by the use of cement mortar that the value of the brick can be developed, for strength of a wall depends on the strength of the mortar. Now, for any homogeneous material, such as steel, it is usually considered quite safe to allow a working stress up to one-fifth or one-fourth of its ultimate strength, but for brickwork conservative engineering practice does not permit more than one-tenth or one-twelfth (7 to 8 tons). Thus to carry a given load we have to use two or three times as much brickwork as we would if we could have the same confidence in it that we have in steel. This is a further waste of the strength of the brick.

But there are still other handicaps put upon the use of brickwork which are not necessary. In some cities the building by-laws will not allow even the conservative unit stresses given above, but fix the limit as low as four tons per square foot—about what is considered safe for solid earth. This means that in these cities, to carry a given load, the amount of brickwork must again be doubled.

Now, approximately half the cost of brickwork is for the labour required to lay it. In this country we expect to pay masons at a somewhat higher rate, in proportion, than that received by some other trades, because of the fact that there are four months in the year during which there is not much bricklaying done. In other words, we only use 75 per cent. of the available skilled labour of this trade. We are safe in saying, therefore, without casting any reflection on brick masons, that, from an economic point of view, bricklaying is not more than 80 per cent. efficient in Canada.

GREAT WASTE IN BRICKWORK.

Thus, for every dollar we spend for brickwork fifty cents is for materials and fifty cents for labour. For this latter half-dollar we obtain labour of which we only use forty cents' worth, and which it is possible, by the adoption of systematic methods, to reduce to a cost of twenty cents. We are, therefore, getting seventy cents' worth of brickwork for one dollar. But, as in some cities, we are required to use twice as much brickwork as we need for strength, in such cities we only get thirty-five cents' worth of strength for one dollar. The same by-laws will allow us to put about four times the load on plain concrete that is permitted on brickwork, and the cost of concrete in piers and walls is approximately the same as brickwork. So for one dollar invested in concrete we will get about twelve times as much strength as we would from the same spent for brickwork, assuming that we get 100 per cent. efficiency in the placing of the concrete.

These figures must not be taken too seriously, for they in no way express the true relative value of brick and concrete. They are given to emphasise the fact that there is room for improvement in the use of even the oldest of clay products, and that in order to successfully compete with other materials the highest standard of product and efficiency in workmanship are essential. They also illustrate the evil effects of unreasonable building laws.

CLAY PRODUCTS FOR FIREPROOFING.

In fireproof construction the principles of engineering are so greatly used that it is not more than necessary to mention the subject here. The desirability of this type of construction for large buildings is admitted by all. But we have reached a point where fireproof construction can be used with splendid results for moderate size residences running from eight or ten thousand dollars in cost and up.

In working toward this higher standard of building in which the construction features are entirely engineering, the engineer is closer to the manufacturer of clay products than the architect is. Those architects to whom the bulk of this class of residence work goes make no claim of being engineers, and it means a radical and expensive departure from their accustomed practice to undertake it. The owner, on the other hand, knows even less about it, and, even if inclined to consider it, is easily discouraged by a hint at a great increase in cost. This is a field for fireproofing materials that has hardly been touched as yet.

* Read before the Canadian National Clay Products Association.

The Penzance Town Council have agreed to the appointment of Mr. H. Maddern as temporary borough surveyor.

Our Office Table.

At the Birmingham Munitions Tribunal last week, Professor Tillyard presiding, ten workmen—namely four bricklayers and six labourers, engaged by a manufacturing firm, asked for their leaving certificates on the ground that they were refused the proper trade rate of wages. It was said the firm were paying only the Midland Trades Federation rates, which worked out at 32s. a week for labourers, and 11½d. an hour for bricklayers, whereas it was claimed that the proper rate for the men was that of the Master Builders' Federation settlement—namely, 9½d. an hour for labourers and 1s. 0½d. for bricklayers. The firm had refused the latter rates, hence the applications for certificates. A representative of the firm said the men were doing general bricklayers' repairs inside. The Chairman said if an outside builder were doing the work he would have to pay the rate. Why should the firm pay less if they did the work themselves? The firm's representative replied that the certificates would be granted to the men. Indeed, they had been ready since March 28. The point was then raised that in consequence of the certificates being withheld the men were kept out of work for ten days, and compensation was asked for. It was said the men, on the advice of their trade union officials, attended the works and offered their services on the old terms, but were refused work, and the firm's contention was that the week's notice they gave was irregular, being given on the wrong day. The Tribunal decided that the men must have their certificates, but refused to grant compensation because they based their application for the certificates on the ground that they were not being paid the standard rate of wages, and not on the ground that work had been withheld from them.

With reference to our note on the *Athenæum* in our issue of Saturday, we regret having unwittingly given an impression which the editors think may cause some considerable confusion. We learn with regard to the new proprietorship that, so far from implying a break in the continuity of the reconstruction policy of the journal, the change was actually made to ensure the more effective development of that policy. The *Athenæum* has for some time addressed itself to the consideration of social problems, and in particular to the urgent difficulties which will face the country after the war; it has done this more definitely and explicitly since the New Year. The editorial board remains unchanged, which is the best guarantee for the continuity of the policy. While determining to maintain the scholarship and authority of the *Athenæum*, the editors feel themselves unable, in this significant time, to practise the detachment implied in continuing to produce a journal that is only literary. Literature itself is less detached; and the *Athenæum*, having been originally founded as a journal of politics and literature, feels that it has never had a better occasion of linking up with its old traditions.

At the forty-seventh ordinary meeting of the Val de Travers Asphalte Paving Company, Limited, to-day, held at 18, Hamilton House, 155, Bishopsgate, London, the balance sheet and profit and loss account duly audited for the year ending December 30, 1916, was adopted, after making the following appropriations:—Depreciation and cost of maintaining plant and machinery, £1,717 6s. 4d.; written off cost of Neuchatel concession, £882 7s. 1d.; depreciation in value of horses and harness, £40 17s. 5d., and Venezuelan concession account, £1,468 1s. 10d.; the net profits of the year are £12,584 6s. 10d., which with the sum brought forward, £2,114 3s. 1d., amount to £14,698 9s. 11d. From this has to be deducted the interest on the debenture stock, amounting to £6,900. An interim dividend of 3d. per share was paid in October last, a further dividend of 4 1-5d. per share, less income tax, is now to be paid, making 3 per cent. for the year, and leaving a balance to be carried forward of £1,918 9s. 11d. The shareholders will remember that in 1910 the directors were authorised to spend £5,000 in exploiting for oil on the company's bituminous deposit in Guanipa, Venezuela. It was found later that the concession did not include the right to prospect for oil, and repeated efforts failed to secure this. As the bituminous deposit ceased to be of any value the board, in the latter part of last year, after mature reflection, decided to abandon the property and write off the amount standing to the debit thereof which, after deducting the sale of the realisable plant and by utilising the sum of £20,841 7s. 11d. hitherto standing to the credit of the depreciation fund, left a balance of £1,468 1s. 10d., which has been debited to profit and loss account.

The Defence of the Realm Losses Commission had again before them last Wednesday the claim of the Duchess of Albany for timber cut from her estates at Esher. Mr. Austen Chamberlain (for the Crown) pointed out that under a settlement the property was vested in the duchess with a limited right to cut timber-like trees. Assuming the value of the timber cut was £10,000, the injury sustained by the duchess would be equal to the interest for her life upon that sum. He suggested, however, that she would be properly compensated if she received one-fourth of the value of the timber for herself and as an annuity the actuarial value according to her age and the interest upon the figure. After some discussion the Chairman intimated that the Commission would reserve its decision, and if necessary ask for further evidence.

Earl Beauchamp has lent for exhibition at the Victoria and Albert Museum the collection of miniatures and snuff-boxes from Madresfield Court. The exhibition contains 372 miniatures in water-colour, oil, and enamel by English and foreign artists, chiefly of the sixteenth, seventeenth, and eighteenth centuries, together with 31 snuff-boxes, chiefly French, and dating from the eighteenth century. It is arranged in Room 84, and visitors will find in the collections shown in these two rooms representative examples of the work of practically every English miniature artist of importance of the sixteenth, seventeenth, and early eighteenth centuries.

There was issued on Thursday last a return showing the temporary buildings erected and premises hired or requisitioned for Government offices in the London district last year. It is pointed out that the offices for the headquarters of the department dealing with unemployment insurance at Kew, erected at a cost of £85,000, are intended for permanent use after the war. Various buildings not erected in public parks and gardens, public or private, will also be suitable for use for extended periods after the war. The buildings acquired include eight hotels, four clubs, nine public buildings (museums, galleries, municipal buildings, etc.), 12 private houses, 96 commercial offices (either whole premises or portions of premises), and 14 warehouses. No hotels have been bought; all have been either hired or requisitioned.

The Church of St. Nicholas Cole Abbey possesses many interesting old treasures, and some of these, says the *City Press*, are sadly in need of renovation. The repairs of the vestments, burses and veils, and the renewal of the amices and albs are will in hand already, but other valuable and venerable relics which need attention are the Chained Book, the Processional Cross and the ancient leather case of one of the Chalices. The Chained Book is not the Bible, but "A Companion of the Temple and Help to Devotion in the use of Common Prayer." The book is dated 1688, but it underwent repair in August, 1830. A substantial iron chain fastens it to the desk on which it rests. The cross, consisting of copper and brass, and bearing figures beautifully carved, is a still more ancient treasure, dating back to the fourteenth century. The date of the leather case is 1712. The Guild is providing the funds, and the work of restoration will be carefully carried out by experts. A beautiful fourteenth century maniple from Italy, adorned with silver thread on flowered silk, has been given to the church by Mrs. St. George.

The Society for the Protection of Ancient Buildings has learnt that the south side of Queen Anne's Gate is threatened with destruction, with the object of obtaining a large building site It is by far the finest example of old London house architecture remaining, and therefore the committee hope that the danger may be publicly known, in order that those who can bring influence to bear against such a shameful destruction may have the opportunity of doing so.

Building Intelligence.

BISHOP'S LYDEARD.—At the Somerset County Council meeting at Wells, last week, in reference to Tatham Farm, Bishop's Lydeard, it was decided to seal the conveyance, and Mr. G. H. Oatley, of Bristol, is to be asked to prepare plans. Mr. Kidner desired to have an open competition for plans, and said they should guard against expensive buildings. It was explained that it was necessary to have the plans prepared, so that as soon as the war ended the buildings could be proceeded with, and the recommendation of the committee was adopted, an amendment by Mr. Kidner to throw the plans open to architects finding no seconder.

TESTS OF CONCRETE IN SEA WATER.

A paper, presented January 3, 1917, to the American Society of Civil Engineers, describes a test of twenty-four concrete specimens which were immersed in sea water for seven years. The object of the tests, as described in the Proceedings of the society, was to determine the action of sea water on concrete specimens of wet and dry consistencies, of various proportions of ingredients, and of different brands of cement, as well as the effect of special compositions.

The methods of mixing, analyses of the various cements, sand and stone, and the conditions of the test, as well as all other data having possible effect on the results, are stated in the paper. The information is given in tabular form where possible.

The specimens were examined at intervals of about one year, and record was made of their condition. The results of these observations have been tabulated, and show progressive deterioration of some of the specimens and remarkable durability of others. Recently, the specimens were examined with great care, and graded in the order of durability. These results are also tabulated. Independent tabulations are made of the various series of tests originally planned, to ascertain in one case the effect of wet and dry mixture, in another case, the effect of rich and lean mixture, and in others the effects of special brands of cement and of using lime, Sylvester wash, etc., with the cement.

The results are interesting, and seem to show, briefly:—

(a) That the 1.1.2 mixture is superior to the 1.2½.4½, and that the 1.2½.4½ is, in turn, superior to the 1.3.6;

(b) That the wet mixtures are superior to the dry;

(c) That the effects of magnesia or alumina in varying proportions are not very marked, and follow no apparent law, although the two most durable specimens are those lowest in alumina content;

(d) That extra care in mixing produced decidedly beneficial results;

(e) That hydrated lime was of no benefit, but rather a detriment;

(f) That the addition of Sylvester wash was harmful; and

(g) That the addition of clay to the cement had a slightly beneficial result.

The deterioration occurred between high and low water, and was most marked at mid-tide. Above high water there was little deterioration, and the same is true, but to a less marked extent, of the concrete continually submerged.

It is stated that a careful reading of the entire paper should be made before any of the foregoing conclusions are applied.

The experiments are not sufficiently extensive to warrant drawing final conclusions in all cases, unless confirmatory evidence is available. In utilising the results, the limitations of the tests and local conditions should be taken into account.

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PARLIAMENTARY NOTES.

Contracts Entered Into Before War.—Last week, on the consideration of the Courts (Emergency Powers) Bill in Committee, on Clause 1, Mr. Nield moved the first of a series of amendments empowering a judge of the High Court or of a county court to grant relief if necessary in respect of all contracts entered into before the war, and which, owing to the outbreak of hostilities, it was difficult to carry out. Sir Gordon Hewart (Solicitor-General) pointed out that the Bill was designed to meet three or four specific grievances. One of these was builders' contracts which owing to the war, could not be performed within the stipulated time. If the Government were to consent to the amendment there would be no restriction upon any kind of contract for which a grievance could be shown, and a man who had entered into a contract for marriage might seek to obtain relief, because in consequence of circumstances arising out of the war he no longer found it convenient to carry out his promise. The amendment was withdrawn. Mr. Peto moved an amendment substituting July 17, 1915, for August 4, 1914, as the date to which the clause should apply in respect of builders' contracts. Sir Gordon Hewart said the clause drew a line between builders' contracts entered into up to the outbreak of war and those which were entered into subsequently. If the amendment were accepted the effect would be this, that for a period of two years builders would have been able to enter into these contracts with their eyes open, and stood to gain from them, but if they lost by them they were to have the benefit of going to a judge in order to seek to be relieved of their obligations. The Government could not depart from the obvious line of demarcation, namely, the outbreak of the war. The amendment was, after discussion, defeated by 115 to 16. Mr. Peto moved that, in addition to the discretion of the court to suspend or annul a contract in case of hardship arising out of the war, it should also be empowered to vary or rescind any of the provisions of the contract. Sir Gordon Hewart said the clause as it stood went to the utmost limit of what was practicable or reasonable in order to meet a grievance. If the amendment were adopted it would give power to the court even to make a new contract altogether. The clause was added to the Bill.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the Building News, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

***Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.

Telegrams: "Timeserver, Estrand, London."
Telephone: Gerrard 1291.

Received.—H., Bros.—R., Ltd.—J. F.—H. H. and Son—C. M. Co., Ltd.—W. W. and Sons—D. J. S. and Co., Ltd.—H. M.—E. B. D. C. and C.

A J. W.—No.

T. M.—Please send.

R. O'H.—Thanks, no.

E. M.—Please see our "Directory" pages.

Builder.—It is not a firm we should care to deal with. 2. Yes.

Mr. E. Lailey, surveyor to the Watford Rural District Council, has been voted an increase of salary of £50—viz., from £400 to £450 per annum.

Telephone DALSTON 1388.

OGILVIE & CO. Many years connected with the late firm of W. H. LASCELLES & CO., of Bunhill Row.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

Ashford (Kent).—Supply of granite and granite chippings, for the West Ashford Rural District Council:—

J. Carr and Co., Dronfield, near Sheffield (accepted).

Bedwas (Mon.).—For road widening and laying paving, kerb, and channel, with appurtenant works, at Church Street, Bedwas, for the Bedwas and Machen Urban District Council. Mr. A. S. V. Taylor, A.M.I.C.E., surveyor:—

E. James, Ystrad Mynach	£292
J. Sutherland, Abercynon	270
G. Wilkins, Pontllanfraith (accepted)	258

Bishopstone (Wilts).—For repairs to Middle Bridge, Bishopstone, for the Wilton Rural District Council:—

Tabor (accepted)	£29 15 6

London, S.E.—For painting, cleaning, and repairs to the South-Eastern Ambulance Station, for the Metropolitan Asylums Board:—

Smith and Sons, W., 202, London Road, Croydon	£373 0 0
Harding and Son, R., 75, Arodene Road, Brixton	253 18 0
C. H. Boyd and Son, 6, Dyer's Buildings, Holborn, E.C. ..	204 0 0
Inns, A. H., 7, Devonshire Square, Bishopsgate, E.C.	194 0 0
Kazak, L., Railway Place, Belvedere (accepted)	190 0 0

Acting Engineer-in-chief's estimate, £211.

Loughton (Essex).—For supply of road materials, for the Loughton Urban District Council. Mr. H. White, surveyor:—

Granite: British Macadams, 123, Cannon Street, London, E.C.4, 21s. 11d. per ton; C. Abell, Ltd., Hartshill Granite Quarries, 15s. (accepted). Granite chips: C. Abell, Ltd., 12s. 5d. (accepted); H. L. Cooper, 29, Mark Lane, London, E.C., 13s. 3d.; Brookes, Ltd., Caxton House, Westminster, 19s. 3d. Gravel: W. and C. French, Buckhurst Hill, 9s. (accepted); W. Skipp, Ware, 6s. 3d. Hoggin: W. and C. French, 9s. (accepted); W. Skipp, 6s. 3d. Steam rolling: G. J. Anderson, 26, Lower North Street, Poplar, roller 35s. per day, scarifying 1½d. per yard, standing 17s. 6d. per day: J. J. Prior, Salmon Lane, Limehouse, E., ditto., 30s., 1d. and 12s. 6d.; W. G. Smoothy, Rochford, ditto, 25s. 6d., ½d., and 7s. (accepted).

Shifnal (Salop).—For supply of stone, etc., for the rural district council:—

Accepted tenders:—Stone to Shifnal Station, Pyx Granite Co., Clee Hill Co. and Ceiriog Co., 10s.; to Albrighton Station, ditto, 10s. 6d.; to Madeley, Pyx Co., 10s. 2d.; to Stretton and Wheaten Aston, E. Richards, 12s. 6d.; to Stirchley, Pyx Co., 10s. 9d.; slag to Shifnal 4s., Albrighton 4s. 4d., Madeley 3s. 6d., W. Harper; tarmac to Shifnal 14s. 2d., Albrighton 13s. 9d., Tarmac Co.

Sutton (Surrey).—For repairs and distempering of ceilings, etc., at the Downs Sanatorium, for the Metropolitan Asylums Board:—

Smith and Sons, W., 202, London Road, Croydon	£248 0 0
Inns, A. H., 7, Devonshire Square, Bishopsgate, E.C.	217 0 0
Boyd and Son, C. H., 6, Dyer's Buildings, Holborn, E.C. (accepted)	153 0 0

Acting Engineer-in-chief's estimate, £146.

Sydney (Australia).—For supply of two steam turbines and condensers for Ryde Pymble pumping plant, for the water and sewerage board:—

A. Harvey and Phillips	£17,420
W. Adams and Co.	16,144
Ditto (alternative)	14,729
Australian G.E. Co.	14,700
Price, Martyn and Co.	13,952
Willans and Robinson, Ltd. ..	13,505
Fraser and Chalmers, Ltd. ..	13,356
British Westinghouse Electric and Manufacturing Co., Ltd.	12,569

The *Sydney Sun* says the engineer-in-chief has reduced these tenders to a common basis, f.o.b. England, and recommends the tender of Fraser and Chalmers as the most favourable.

Walthamstow.—For the erection of a chimney shaft at the electricity works, for the urban district council:—

Custodis, Ltd. (recommended for acceptance)	£1,143

LIST OF TENDERS OPEN.

BUILDINGS.

April 12.—Remodelling Pig-styes at the Bermondsey Military Hospital, Ladywell, S.E., according to specification.—For the Bermondsey Board of Guardians.—E. P. Fenton, Clerk, 283, Tooley Street, S.E.

April 14.—Reinstating portion of the damaged part of the Girls' County School, Hengoed.—For the Governing Body of the Gelligaer County School for Girls, Hengoed.—Specifications and copy of bills of quantities, County Architect's Office, County Hall, Cardiff.—G. A. Evans, Clerk, Ffrwd Offices, Mountain Ash.

April 14.—Repair and Painting lengths of timber and iron fencing and cast-iron parapets in connection with seventeen bridges, in the West Derby Hundred.—For the Main Roads and Bridges Committee.—Chairman of the Main Roads and Bridges Committee.

April 25.—Erection of a Bungalow.—For Mr. G. Hunter.—Specifications, plans, etc., from architect, Mr. O. Hocking, The Acorns, Rettendon, Chelmsford.

ENGINEERING.

April 12.—Construction of a reinforced concrete Waste-water Tank at the Bradford Road, Manchester, station.—For the Gas Committee.—Gas Offices, Town Hall, Manchester.

April 14.—Supply of a small portable Baling Press, with wheels, for baling waste paper, etc.—For the Tewkesbury Town Council.—H. A. Badham, Town Clerk, Tewkesbury.

April 30.—Installation of a Vacuum Steam-heating System, and Supply and Erection of Power-house Buildings and Chimney.—For the Canterbury University College, Christchurch, N.Z.—The Registrar of Canterbury College, Christchurch, N.Z

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

PAINTING.

April 16.—External Painting of various Schools.—For the Norwich Education Committee.—C. J. Brown, Architect and Surveyor, Cathedral Offices, The Close, Norwich.

April 17.—Outside Painting at the County Police Stations at Birtley, Coxhoe, Ferryhill, Fighting Cocks, Norton, Sacriston, Sedgefield, Spennymoor, Thornley, and Wingate.—For the Durham County Council.—County Surveyor's Office, Shire Hall, Durham.

ROADS AND STREETS.

April 14.—Granite, Slag, and Ironstone to Ruskington Station (carriage free) during season.—For the Ruskington Urban District Council.—The Clerk, Council Chamber, Ruskington.

April 14.—About 650 tons of Basalt, Granite, or other suitable stone, broken to a 2-in. gauge, to be delivered to Tonbridge Station of the South-Eastern and Chatham Railway.—For the Southborough Urban District Council.—P. Hanmer, Clerk, Council Offices, Southborough.

April 16.—Three hundred yards Granite (Leicester); 300 yards clean Hoggin; 200 yards clean, sharp Sand, suitable for covering tarred roads; and 200 yards Kent Ragstone, free from hassock, etc., the whole to be delivered in barges alongside Sheerness Pier, or by rail at Sheerness Station, at contractor's cost.—For the Sheerness Urban District Council.—V. H. Stallon, Clerk, Council Offices, Sheerness.

April 16.—Granite Macadam, Setts, Kerbstones, and Sanitary Pipes to March 31, 1918.—For the Runcorn Rural District Council.—W. E. Hough, Acting Clerk, 71, High Street, Runcorn.

April 16.—Broken Granite and Slag (One Year).—For the Belchamp Rural District Council.—S. Allpress, Surveyor, Sudbury, Suffolk.

April 16.—Supply and carriage of Granite or other approved Macadam, Kentish Ragstone, and Beach.—For the Tenterden Rural District Council.—H. B. Mace, Acting Clerk, Tenterden.

SANITARY.

April 16.—Construction of about 100 yds. of 9-in. Drain, with Manholes, etc., in the Parish of Healing.—For the Grimsby Rural District Council.—J. F. Wintringham, St. Mary's Chambers, Grimsby.

Second-Lieutenant Lewis S. Whittingham, only son of Mrs. L. B. Whittingham, New Hall, Llandrinio and Rhyl, has been killed by a shell splinter in the front-line trenches. In pre-war days he was for eight years in the Powys Castle Estate Office, where he qualified as a land surveyor and estate agent, and afterwards acted as agent for the Stopham Estate, Sussex, and at Millichope Park. He was also surveyor under the Land Valuation Act for a portion of Shropshire, residing in Shrewsbury. He joined in 1915 the Inns of Court Training Corps, and gained his commission in September the following year. In the following month he was sent to France with the 7th Royal Welsh Fusiliers, but was at once attached to the 1st Batt. Royal Inniskilling Fusiliers.

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THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.2.

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OUR ILLUSTRATIONS.

The Castello and Ponte St. Angelo, Rome, from the Winter Exhibition of Graphic Art at the Royal Academy. An Etching by Sir Ernest George, A.R.A.

Bishop's New Throne, Manchester Cathedral. Working drawings. Sir Charles A. Nicholson, Bart., F.R.I.B.A., Architect.

House at Hinderton Neston, Cheshire. Garden Front. Messrs. Briggs, Wolstenholme and Thornely, FF.R.I.B A., Architects.

An Interior in Paris for Messrs. Maple and Company, by Lieut. Murray Adams-Acton.

Currente Calamo.

We congratulate Sir John Jackson on the result of the inquiry by the Royal Commission into the allegations made by the Public Accounts Committee against his firm. It absolves him entirely from all imputations of want of patriotism and from the discreditable charge of having brought about a state of things in which the firm could or did exact exorbitant terms. As regards the Commission's opinion that the sum to which the firm became entitled for commission, in addition to that for which 1½ per cent. was claimed for head office expenses, was far in excess of any reasonable remuneration, it must be manifest to all fair-minded men that, as the Commissioners themselves admitted, even if willing to make concessions, Sir John Jackson was reasonably disinclined to do so while allegations of the sort he has had to rebut were unanswered. Now that they are proved baseless, his readiness to accept less than the full remuneration to which, as Mr. Forster admits, he "is legally entitled," is as creditable to him as the persistence with which he has combated charges which should never have been brought. Mr. H. W. Forster's somewhat airy appreciation of this attitude, now that the Royal Commission's report is made, at the conclusions of which he "has only had time to glance," seems to us a piece of official nonchalance too characteristic of the War Office, and of a piece with the whole conduct of that Department, which is really responsible for the neglect of opportunities of which, as the Report says, "they did not avail themselves" of postponing a settlement of terms to which at the outset they might, could, or should have objected.

The very valuable paper read by Mr. J. G. Head, F.S.I., at the Surveyors' Institution, makes three things additionally clearer, which we have striven continuously to impress on all concerned—with scanty success so far, and at present with little hope till rulers blest with more common sense come to our aid, and till the well-meaning quack-mongers and philanthropists open their eyes to the fact that unless the property market is in a healthy condition houses will not be built, and builders will be idle, together with all the kindred industries dependent on them. The first and foremost necessity, of course, is the freeing of the country from the malign influence of the Finance Act, 1909-10. Till the tax, as at present applied by the Inland Revenue Department, is repealed, which is based on the unfounded assumption that the freeholder must pay a substantial part of the imaginary bonus, or "increment," for which it is insisted no consideration has been given by him, the conviction will spread that this is only the beginning of a general campaign against landowners, and all property will decline in value as an investment, or as a security. Next, liberal provision is wanted on a business basis of liberal financial assistance to the property market; and, lastly, the recognition by all of us that the supposed advantages of foreign scenery and health resorts are quite subordinate to those obtainable in our own country, as hundreds have found out during the past three years. Mr. Head's suggestions in regard to the provision of cheap money for land purchase seem to us to be essentially practical, and his figures entirely reliable. We advise their careful study.

The shortage of houses is increasingly telling on the better-class London suburbs, and it is certain that when peace comes all-round increases will be made, and that tenants desiring to retain their homes will have no alternative but to agree to the owners' demands. Others, compelled to save, will compete with the lower middle-class, and this, in turn, will react upon the working classes. There will, of course, be an outcry against the rapacity of the owners; but there will be two sides to the question. For many years past house-letting has been conducted upon the principle that the return after the payment of all charges should be equivalent to 5 per cent. All building material has increased to an extraordinary extent before and since the war and the cost of labour bears no resemblance to that formerly prevailing. With Government security for a 5 per cent. dividend, house-owners will not be content with less, and may ask for more, and tenants will be obliged to meet the demand. Before the House of Commons rose for Easter there was a call for an extension of the Limitation of Rents Bill for two years after the war. Like most simple remedies, that Act had a fatal defect. Housebuilding after the war will be a clamant necessity; but if owners were to be limited to less than the Government is willing to give for capital, there would be an end of all enterprise. Housing cannot be left to take care of itself; but our present experiences in regard to other matters which our latest rulers have undertaken to regulate hardly warrant the hope of much benefit from more similar interference!

The experiences of Mr. Walter B. Griffin, the American architect who won the competition for Australia's new Federal Capital, Canberra, which was to be brought, Aladdin-like, out of the earth, have evoked some drastic comments by Mr. Richard F. Bach in the *American Architect*. Our own doubts at the time the competition was arranged will be remembered. We thought and said then that it was unlikely that any such expenditure on plans and buildings as was incurred by the Australian Government, while the competition was actually in progress, could ever be fruitful in the ultimate adaptation of a selected design to fit, and so it turned out. The competition was settled on May 14, 1912; and, after spending six and three-quarter million dollars on its "built-up plan," that was abandoned, and Mr. Griffin was appointed "Federal Capital Director of Design and Construction." Then friction soon followed. Mr. Griffin returned to Chicago to arrange his affairs previous to working out his design, having delivered a farewell homily to the Australian Government of a somewhat involved character, but in the main a not unreasonable reminder that the competitors in the subsequent competition for the Parliament House should bear in mind that a fine English Renaissance design or a picturesque Gothic silhouette would not logically take its place in the backwoods of Australia, and that time, place, and local conditions should be permitted to play their part in so important a project. Before Mr. Griffin left he was "lent" a gentleman attached to the Australian Patent Office to prepare preliminary plans, and when he returned, we are told, "all his earlier work had

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been shattered, his supporters crushed, his plan all but discredited, and departmentalism was again in the ascendant."

Then something like a battle-royal followed. Mr. Griffin had visited and been advised by the four adjudicators for the proposed Federal Parliament House Competition—Sir J. J. Burnet, of London; Mr. Louis N. Sullivan, of Chicago; M. Victor Laloux, of Paris; and Herr Otto Wagner, of Vienna. He had also gathered the opinions of other architects, and, we are told, the weight of all this evidence was so entirely in favour of his plan that "the pendulum swung once more in his direction, but departmentalism countered him by refusing him the necessary professional assistance, which, unfortunately, was in the gift of officialdom," and when he assailed the Director of Works "he was promptly sent packing." Mr. Griffin appealed to the Minister of Home Affairs, who thought "design and construction should be independent of one another, and that design can be laid down without reference to construction, which could then be taken up subsequently." However, the Home Minister issued orders that Mr. Griffin was to be assisted in every possible way, and that the Director of Works was to give "expeditious answers" to his questions. Several months' correspondence followed before the extent of Mr. Griffin's authority was defined, and the way seemed more clear after two years' skirmishing. Then came the War and a whirlpool of political confusion, and Canberra was pigeon-holed. To-day the project is not a whit nearer completion than it was five years ago; and what Mr. Griffin's position is, or whether the Capital or the Parliament House will ever be built at all are speculations which those familiar with the ups and downs of Australian political life may more or less profitably occupy themselves with. So far the only result is the addition of another chapter to the long history, here and elsewhere, of the pernicious consequences of the meddlesome interference of officials in matters of which they have no knowledge, and over which their control, even when well intentioned, is at the mercy of political opponents and graft-mongers.

The war bonuses conceded to the railway staffs last week are the third given since the war began, and the total extra cost is roughly estimated at £21,000,000. The railway companies paid 12½ per cent. of the first 5s. bonus, but they were not required to contribute anything to the second, and as they were not even parties to the negotiations last week—the managers conducting them as representatives of the Railway Executive, which is another name for the Government—it is evident that no part of the third will fall upon them. Last September, when the second bonus was granted, the *Statist* said it had analysed the accounts of thirty-two of the most important lines in Great Britain and Ireland, whose net income represented over 96 per cent. of the whole, and found that the net profit available for dividend on the ordinary stocks for 1913—the year before the war—was £18,300,000, and the dividends actually paid on them amounted to £17,200,000, from which income tax was deducted. It will be seen that the bonuses which have been conceded since exceed those amounts. What is likely to happen? Is it probable that the railwaymen will surrender the whole of the advance conceded to them, or even a considerable portion of it, at the close of the war? Can the companies, if their lines are restored to them, effect such economies, by continuing to work in combination, as will pay the extra labour bill? The only alternatives are a big increase of railway rates or—nationalisation. Neither of which can be faced with complacency by traders or shareholders.

Some extraordinary disclosures are made in a report on the upkeep of river banks and the drainage of the Yorkshire West Riding area which was submitted last week to the Yorkshire Farmers' Union. A committee appointed to inspect the area around Doncaster report that a considerable quantity of land has gone out of cultivation through neglect of the drains and the permittance of tree root-growth. Several extraordinary instances are given, the result being the decrease of food production to a considerable extent. The committee recommended the appointment of a working committee of practical men, with a good knowledge of agriculture, and also a knowledge of the drainage of the district affected, provided with the labour necessary to carry out immediate remedial works, and power to appoint a duly qualified drainage engineer to act under their control, the committee to have power to do such work as they consider necessary, and to recover cost of labour from various owners or tenants. As a permanency, the committee suggest the appointment of a body of commissioners, with power to appoint an inspector or inspectors, to report on any case and to carry out works which may be necessary. Some such step seems certainly desirable

Albert George Dyke, trading as R. M. Wright and Co., motor engineers, etc., at 12, Newland, was summoned before the Lincoln magistrates last Wednesday week for keeping a greater quantity of petroleum than the 2,000 gallons he was licensed to store—viz., 2,370 gallons; and, further, for using an open yard for storing more than 100 gallons—viz., 1,500 gallons of petroleum—on March 17. The facts were admitted, and the Chief Constable read a letter he had received from the defendant on March 14, in which he stated that he had been appointed as district organiser for North Lincs for the machine implement section of the Board of Agriculture, that a number of motor tractors had been allocated to the district, and that it would be necessary for his company to have at least 2,000 gallons of petroleum in store in case of delays on the railway, and he applied for an extension of his licence. He (the Chief) replied that he could not give such permission, it being a matter for the Watch Committee. In reply to the Chairman (Mr. D. McInnes), the Chief said the petroleum had not then arrived; the letter was written in anticipation of it coming.—Defendant contended that he had taken every possible precaution, and said he was bound to accept delivery of the petroleum.—Major Peacock, representing the Board of Agriculture, explained that everything was thrown on the district organiser all in a moment. It was what Mr. Lloyd George described as a forty days' scheme, and everything was rather upset in the organisation of it. There would have been no trouble had they known it was necessary to obtain permission for the storage of the petroleum before it arrived, but as it was the stuff was thrown at Mr. Wright three days after he had made his application. He asked the Bench to look upon it as one of Mr. Lloyd George's hurried schemes for the good of the country, and to let the matter drop.—The Chairman thought it a grave reflection on those responsible for the administration of this part of the Board of Agriculture work that they did not inquire if there was proper storage for the petroleum. They dismissed the cases, but commended the Chief Constable for having brought them.

COMPETITION AND CONTRACTS.

In our issue of December 22, 1915, we gave some particulars of an appeal just then made by the directors of the Master Builders' Association of Boston, U.S.A., to American architects and builders, to unite in an effort to remedy the evils of present competition in building operations. The appeal seemed to us a timely one, and prompted by sound business knowledge and an earnest desire—characteristic, as might be expected—of a virile organisation whose measures and methods might well be considered by some of our less progressive similar bodies this side, to find some better basis of procedure in all that relates to building. It was shown that competition, as carried on to-day, hurts the owner and all his interests by leading to a lack of satisfaction and a lack of durability in the result; that the contractor, looking only for profits, need not care, for he could make as much money at one price as at another within wide limits; that the architect knows these things, but cannot impress them upon the owner, and is often unable to set up a better plan of operation in the face of one that has become so firmly established, in spite of its faults, that the owner is misled in three ways: (1) By believing estimating to be inaccurate because estimates vary widely; (2) by believing his architect can get a good result in any event because of his plans, specifications, and supervision; and (3) by believing that everyone does, and must, submit to the troubles and expenses of building construction executed under usual present-day practices.

During the past eighteen months the Boston Master Builders' Association, having tabulated the evils, in its last "Monthly Letter," just to hand, indicates a remedy. One of the most glaring faults of present methods is the use and choice of sub-contractors, with the temptation, often becoming a necessity, to use low sub-bids. The first and most quickly appearing cure for this is the separate-contract plan, whereby the architect or owner lets every division of the work, and the general contractor becomes an his-

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torical figure. It is obvious at once that as someone decides upon all contractors involved in a piece of work, the only feature which is altered by this procedure is the elimination of the temptation to use the lowest obtainable bids and also of the pernicious practice of trading bids. This bad fault comes into play because and when the general contractor is in competition. Upon a separate contract plan, the man deciding upon these subdivisions would not himself be in a competition involving the figures of the sub-contractors as he chose them in these subdivisions. It is, of course, true that the ordinary general contractor may not select sub-contractors so well as the ordinary architect or owner (although some would doubt this) were the temptation removed to choose only on the basis of prices. The dominant difference, however, is in the fact that the general contractor chooses with relation to a competitive price-total of his own making, while under the separate contract plan this is not done.

It may be argued that the services of a general contractor are important to the work—if they are to any part of the work, they must be to all divisions of it—and that, under the separate contract plan, the architect's office would become extended to include many things it does not now cover. In other words, the architect would in effect become the general contractor, except for paying bills. Conversely, the general contractor could become also the architect. Both of these practices are, in fact, to be found to-day, though to no great extent as yet. Either process requires a greater transition from common practice than is easy of accomplishment, and neither is necessary in order to overcome this great objection to to-day's foolish methods.

Keep the general contractor if he is as useful as a good one can be; but let him have no choice of sub-contractors as a part of any price which determines his own success in a competition. Let him advise with architect and owner if this is wanted, and his advice in such matters often is valuable. Let his competition, if competition must be had, be for his own part of the work only, and let him assume the sub-contracts in the final whole contract price. This method eliminates one of the greatest objections to present-day methods, an objection strenuously advanced by sub-contractors and general contractors alike. It also removes a great danger to the owner, who is perhaps the greatest sufferer from present bad practices.

This way of taking bids and fixing contract price is in use to-day to a limited extent. Variations from it are common. Some architects require a list of sub-bidders, with or without their prices; but this does not wholly stop the trouble, although it is an improvement on the older scheme, wherein no questions are asked about sub-contractors. Many good sub-contractors will not give prices to general contractors; because they are good, their prices are higher than others; and no general contractor using a whole line of such figures can stay in business unless something other than price is the foremost consideration in an award. This fact, also, is evident to all contractors and architects.

Specifications, under this plan of operation, would state that the general contractor shall assume all sub-contracts (prices and persons furnished by the architect), and a fixed percentage, to be agreed upon, will be allowed as his profit or commission on such. His knowledge of costs would enable him to establish the total cost near enough to increase or decrease this percentage as a part of his own figure, if he chose to do so.

These suggestions are no such violent change from present common practice that there need be hesitancy over their adoption. Their acceptance would give the architect a firmer hold on the choice of men than he now has; and by freeing the general contractor from trammels, make his advice available, unbiassed by pocket-book considerations. It need not involve the architect in more trouble in taking estimates—he may specify that the general contractor shall submit figures on various parts of the work, but, of course, should say that these are not to be considered in the award of the general contract. This would not cause the general contractor more trouble than he now takes, and even this may be easily adjusted if necessary. Nor may it be said that a general contractor is "giving away" valuable information as to sub-contractors whose bids he has found advantageous because low. This method fits into present conditions, achieving desirable results without necessitating violent changes in equipment or effort by any of the interested parties.

It has been said that a general contractor should not be held responsible for the work of a poor sub-contractor who might be forced upon him by such a plan. One answer—and a good one—to this is that he has such practically forced upon him by to-day's common methods, and does not question it. The method of what is practically compulsion is different, therefore; but the result, with lower-priced men, is the same—and surely the risk is not so great under this proposed plan. At the same time it would undoubtedly be just to require from the general contractor only his best efforts and judgment, precisely as is done with the architect, leaving all guarantees and demands in case of defective work, etc., only on the shoulders of the sub-contractors involved thereby. This, however, is a further step not needed to maintain the immense advantage of taking all sub-contract prices out of a general contractor's competition. It would probably follow—for without a guarantee of sub-contractor's work, required of the general contractor (as is present practice actually or in real effect) the percentage at which sub-contracts would be assumed in the general contract would be a little less. After all, most of this guarantee and defective work replacement requirement does not hit the mark. The result depends upon the ability of the men who are working it out, and cannot be gained by contract clauses and legal stipulations. Mankind cannot be legislated into honesty, and contractors cannot be documented into ability and quality!

This plan puts all of the various contractors upon the same basis and subject to the same sort of decision. It gives the choice of so-called sub-contractor the same protection as a separate contract plan. It leaves the payment of the sub-contractor to the general contractor, but this is not a great objection in present practice; and by the protection of the new "General Conditions" of the American Institute of Architects, his financial interests are safeguarded better than before.

The cost to the owner will not be greater than now; nor will it be greater, apparently, than under a separate contract plan—for the increase in duties and labour of an architect working under such a plan would naturally lead to added compensation for him. The benefit to the owner will be obvious. There is no unimportant sub-contract upon a building; each one contributes to the quality of the result, and none should be without the serious consideration given commonly to but a few, if any, of them. They should be carefully selected upon the same basis and by the same methods. Price should not be a first consideration with any of them. Beyond this is only the question of who should handle them. He must be a man able to co-ordinate or harmonise the work properly, so that all parts come together at proper times, and so that the many little intricacies involved may be well handled. Call him what you will, to-day he is usually the general contractor, and to keep him, or at most to work away from him gradually, if progress shows this to be desirable, is apparently the part of wisdom for the present. The evils that travel with him can be corrected, and the good, which also is an accompaniment, may be worth saving.

To work further along the line of march towards better methods is to meet another development also used successfully to-day. This is for the general contractor to quote a maximum which he will guarantee not to exceed. In many instances such a procedure is desirable. Unusual difficulties in the work, incomplete plans and specifications, uncertainty as to added cost for short time for completion—many things may lead to a variation in cost hard to estimate, although estimating may be an exact and accurate matter in the hands of capable and careful contractors. Sometimes, as a spur to economy, the contractor is given a percentage of what is saved upon a maximum price, resulting in an increasing profit with a decreasing cost. If too great indefiniteness exists, further protection is offered by a cover sum added to the cost as estimated. These things are all in use, and are all a practical working out of building problems. The price which a general contractor establishes upon such a plan would include prices from sub-contractors selected as suggested—not at all a practically forced choice of low-priced men. This development is therefore not a change of the plan already suggested, but an addition to it.

This method lends itself to competition in the same way as any other; bidders are asked to name their maximum sum, and perhaps the percentage for which they will work. It is often said that percentage work is not executed economically, or that hidden profits are possible; with a maximum price quoted this means that dishonesty will work the price up to that maximum. The added percentage on savings will go far to offset this; but, in any event, is the result better if the price is worked up, or if the cost and quality are worked down?—as is necessarily done in straight contract work. One is directly depleting to the owner's pocket-book, while the other extends the depletion over a greater or longer period, as a cutting of quality reduces durability and increases cost of repairs and maintenance. The troubles with cost and percentage method of doing work can be eliminated by right choosing of men; while the troubles with work let under price competition can never be remedied. When owners realise the facts and consider other conditions than price, there is no longer a pure price competition.

These, at any rate, are the conclusions arrived at by our American brethren. More about them is promised in the Association's next "Monthly Letter," to which we may refer when it reaches us.

At the annual vestry meeting of St. Peter's Church, Norton (Malton), last week, it was decided to raise a memorial to the late Rev. C. J. Chapman, who was vicar of Norton for twenty-five years, and who died in 1906. The memorial is to take the form of a carved lectern.

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THE EFFECT OF WAR CONDITIONS UPON THE PROPERTY MARKET (URBAN).*

By J. G. HEAD, F.S.I.

I was bold enough, in October, 1915, to utter, in another place, views as to the effect up to that time, to formulate reasons for the changes which had been observed, and even to attempt to forecast the position after the war. It is obvious that the last-named attempt could only be of a superficial and tentative kind, since not only would it be impossible to prophesy the result of the war, but even with the firm conviction that Great Britain and the Allies would be victorious no one could foretell the financial and economic conditions under which the nation might labour even when that desired consummation was reached.

There were, it is true, certain broad facts, apparent to all, which could be registered, and certain acknowledged principles governing property values which, when applied to those facts, pointed towards results which could be prognosticated with more or less confidence. The points raised were:—

Reasons for the drop in prices which had already taken place; principles tending to appreciate or depreciate values in the future; observations on the practical results which might reasonably be expected to attend the operations of those principles during the period following the war; and the present occasion affords the opportunity of bringing up to date the results of the war conditions, of noting how far events have justified those observations, and of seeing to what extent they justify the conclusions which were deduced therefrom.

In the first place, the tabulated results of auction sales at the London Mart, taken in conjunction with the universal experience of those dealing with landed securities, indicated a serious diminution in the volume of business done, and also in the prices obtained for those comparatively few properties which changed hands. Certain reasons were adduced in order to account for those results, such as:—

The withdrawal of public interest from the property market, owing to patriotic absorption in the war stifling investment and repressing all desire to launch out into new undertakings; the withdrawal of millions of the population from the world of commerce to that of military and naval service; the concentration of large numbers of those remaining upon work directly connected with the war; the breaking up of families by enlistment, rendering the establishment of new homes inconvenient, and consequently reducing the number of purchasers for occupation; the menace of the stability of all forms of investment, and the diversion of capital to the extent of millions of pounds into the War Loans; the high rate of interest afforded by gilt-edged securities (then 4½ per cent.) rendering house property comparatively unremunerative unless bought at a price proportionately lower than its previous value.

These reasons may or may not cover the ground, but all will agree in the important point that these reasons still exist and still operate. They will tend with increased force to depress prices, and will continue to do so until they are entirely removed. The sums of money required for the prosecution of the war have risen from £3,000,000 to £6,000,000 per day. War loans have recently been paying 6 per cent., and their total has mounted to thousands of millions. The numbers engaged in the war are far higher than ever, conscription has replaced enlistment, all available areas are being scored for recruits, and large numbers of manufacturing concerns have been taken over by the Government.

Obviously, then, it is of the greatest importance to all concerned in the great landed interest to know how it has stood the searching test of war conditions. To this end inquiries have been made of representative auctioneers and surveyors in the various centres of England and Wales, returns have been obtained from the London and provincial auction marts, from the London County Council, and from the municipal representatives of other towns. The returns which have been made are the result not only of the experience and judgment of many of the foremost men in our profession, but also of considerable labour in the preparation of the statistics on which that judgment is based. I take this opportunity of offering my best thanks to all those gentlemen who have so kindly and so efficiently furnished me with information on the subject we now have under consideration.

For the purposes of comparison the country has been divided into four divisions:—

The East Coast area, or that more immediately affected by the menace of enemy bombardment and Zeppelin raids; the Southern and Western districts, as being comparatively free from that menace; the Northern and Midland manufacturing areas; London and its surrounding neighbourhood.

Urban centres have been selected in the respective districts, and particulars gathered relative to the following subjects on the basis of a comparison with pre-war conditions:—

The number of sales and the resulting turnover; the selling prices of ground-rents, factories, large and small shops, large and small dwelling-houses; the difficulty or otherwise of letting similar premises; the variation of rentals obtained for premises newly let; the difficulty or otherwise of negotiating mortgages, the rates of interest demanded, and the proportion of cover required; the effect upon prices and rentals of the increased cost of upkeep due to the rise in prices of labour and materials in the building trade.

The particulars gathered from various districts naturally show considerable variation, but there are certain items which show consistent results over the whole area, as follow:—

Sales by auction or private treaty, for instance, have been fewer by at least 60 per cent., and the turnover has been proportionately reduced. There have been very few dealings generally, and then only under the pressure of necessity or ardent desire.

Freehold ground-rents show a decline in selling price of some 20 per cent.

Shops and dwelling-houses have sold principally for occupation, showing a decline of some 20 per cent. to 25 per cent.

Lettings, with few exceptions, show a sharp decline in the demand for large houses, for those of medium the demand has been almost stationary, with a slight tendency to decline, whereas small houses have let readily, the supply being by no means equal to the demand.

For large and medium-sized shops there is a normal demand, but small shops have in some districts been at a discount.

Factories have found tenants without difficulty.

Rentals have followed the demand indicated above, *i.e.*, they have fallen with regard to large houses; medium-sized properties have maintained their value, while the rentals of small houses have shown a marked upward tendency.

In the case of large and medium-seized shops, rents have been maintained, although in highly rented districts dependent upon the custom of wealthy private residents it has been found necessary occasionally to make a temporary allowance of rent.

Mortgages have been increasingly difficult to obtain, and the rate of interest has increased by from 1 to 2 per cent., as much as 6 per cent. being asked in some cases.

In respect of Building Land transactions have been practically nil; the Government's recent restrictions in building have for a time put the finishing touch to the condition of an industry which was, owing to the war and other influences, in a very languishing state.

The cost of the upkeep of property has been materially raised by the increased cost of labour and materials in the building trade. The effect, however, has not yet been fully felt on property values. Eventually it must do one of two things, either it must be reflected in higher rents (where the landlord does the repairs), or, if these are unobtainable, capital values must suffer. At the moment it has had the effect of postponing all repairs, except those which are urgent, and of hardening rents, the latter operation being rendered possible by the shortage of that class of house principally concerned with the question of upkeep.

These factors are common to all districts, and show the main trend of the effect of the war conditions.

Dealing with the local phenomena, we find that it is on the East Coast that the effect is most apparent. In Margate, Ramsgate, Lowestoft, and towns similarly exposed, the business of property dealings has been brought to a standstill, numbers of residents have left for inland and western districts, and the influx of visitors has been small, having been temporarily diverted to more favourable situations.

In the Northern and Midland areas war work has stimulated all business connected therewith; houses have been filled up, the demand for factories has exceeded the supply, and money has flowed in and circulated freely.

The Southern and Western districts have profited by the exodus from the East, and rents have been maintained.

In London and its outer ring some districts have shown surprising business activity, which is reflected in the maintenance of rentals of nearly all classes of property, but, generally speaking, the main trend is similar to that prevailing throughout the country.

Within the county of London the returns of rate collection show that during the first year of the war "empties" increased only 5 per cent., and even that increase was in respect of shops and residences of high rental value rather than of properties of medium size and small houses.

On the whole it would appear that there has been no general increase in losses due to "empties."

In London we have also the advantage of the Auction Mart return, which furnishes us with the most representative guide as to the movement of the property market. A statement is given showing the amount of sales consummated during the years 1913, 1914, 1915, and 1916, from which we notice a diminution in volume up to the end of 1915, and a slight but encouraging increase since that time.

SUMMARY OF AUCTION SALES HELD AT THE MART DURING THE YEARS 1913-14-15-16.

	Quarterly total.	Annual total.
1913—Jan.—March.....	£344,371	
April—June	1,165.611	
July—Sept.	313,351	
Oct.—Dec.	522,603	
		£2,345,937
1914—Jan.—March.....	£400,141	
April—June	962,505	
July—Sept.	369,679	
Oct.—Dec.	134,304	
		£1,866,629
1915—Jan.—March.....	£195,262	
April—Jund	287,676	
July—Sept.	162,341	
Oct.—Dec.	158,391	
		£803,670
1916—Jan.—March.....	£147,457	
April—June	288,434	
July—Sept.	169,963	
Oct.—Dec.	323,005	
		£928,859

Looking at the results set out above, we see that they present, as might be expected, some variety of detail, according to the local conditions prevailing. These variations are, however, but the cross-currents and internal eddies which accompany every flood, and make little or no difference to the strongly marked tendency operating over the whole country.

In estimating the significance of the results it must be realised that that significance lies not in the absolute figures, nor even in the fact that prices have fallen since the outbreak of war; such a fall in capital value was inevitable, and has occurred with regard to all securities without exception; it lies rather in the comparison between the extent of the fall in the property market and that shown by other classes of investment. To appreciate this fully we must revert for a moment to the relation between the different classes of investment.

(*To be continued.*)

* Read at the Ordinary General Meeting of the Surveyors' Institution held on Monday, April 16, 1917

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Stewart Bale, Photo] HOUSE AT HINDERTON NESTON, CHESHIRE: THE GARDEN FRONT.
Messrs. Briggs, Wolstenholme and Thornely, FF.R.I.B.A., Architects.

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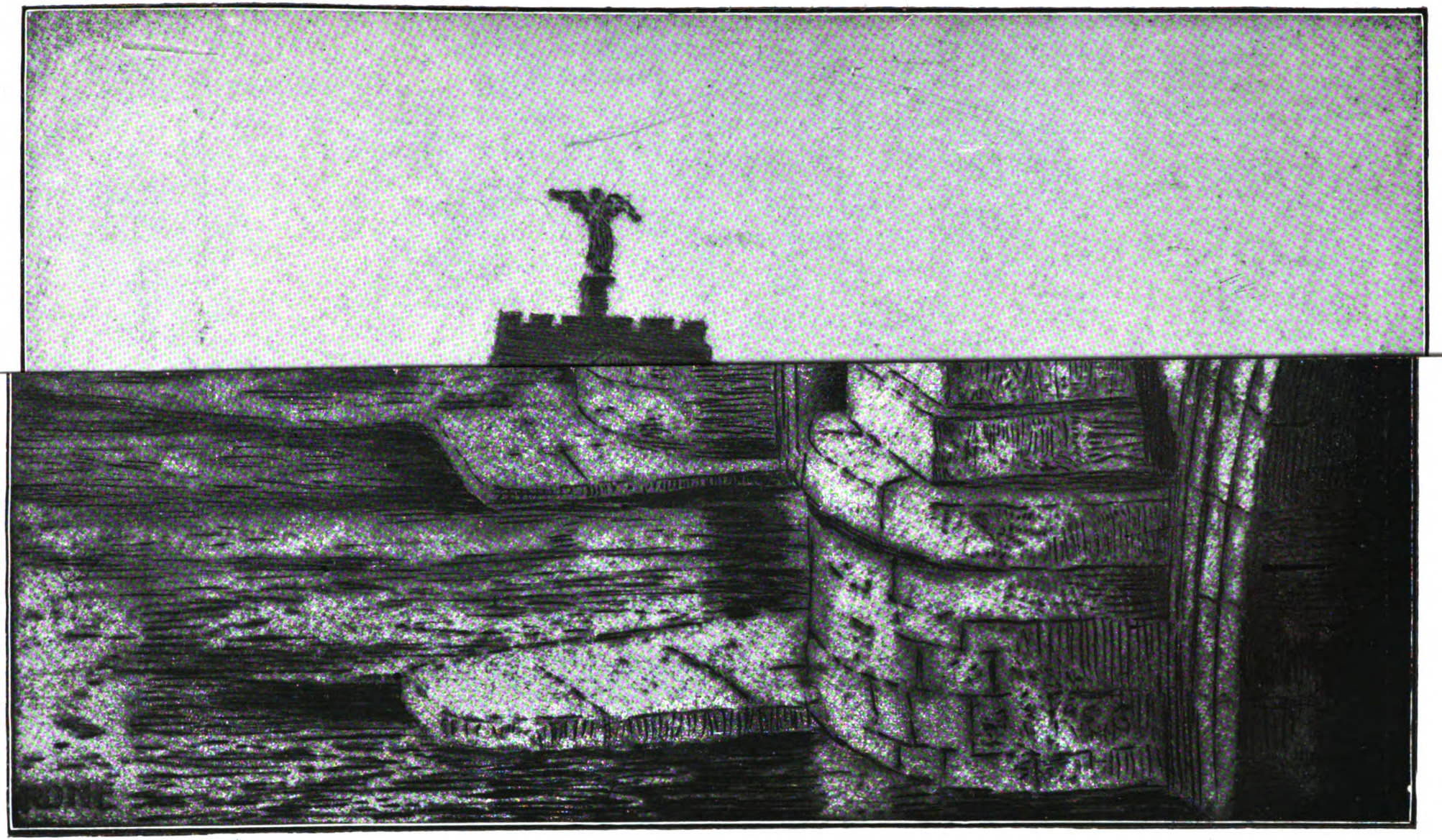

THE CASTELLO AND PONTE S. ANGELO, ROME.
(Royal Academy Winter Exhibition of Graphic Art).—From an Etching by Sir ERNEST GEORGE, **A.R.A.**

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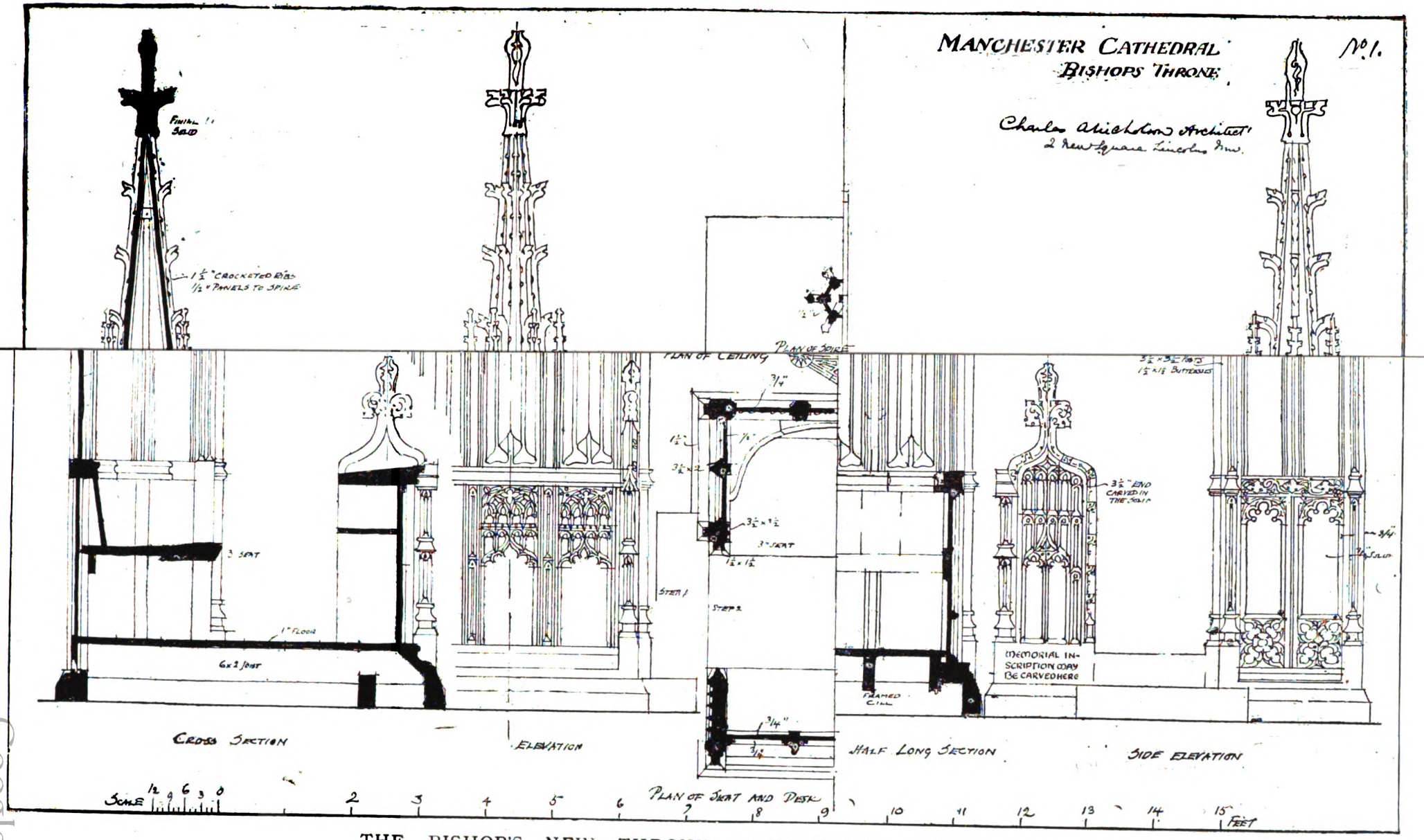

THE BISHOP'S NEW THRONE, MANCHESTER CATHEDRAL.

Sir CHARLES A. NICHOLSON, Bart., F.R.I.B.A., Architect.

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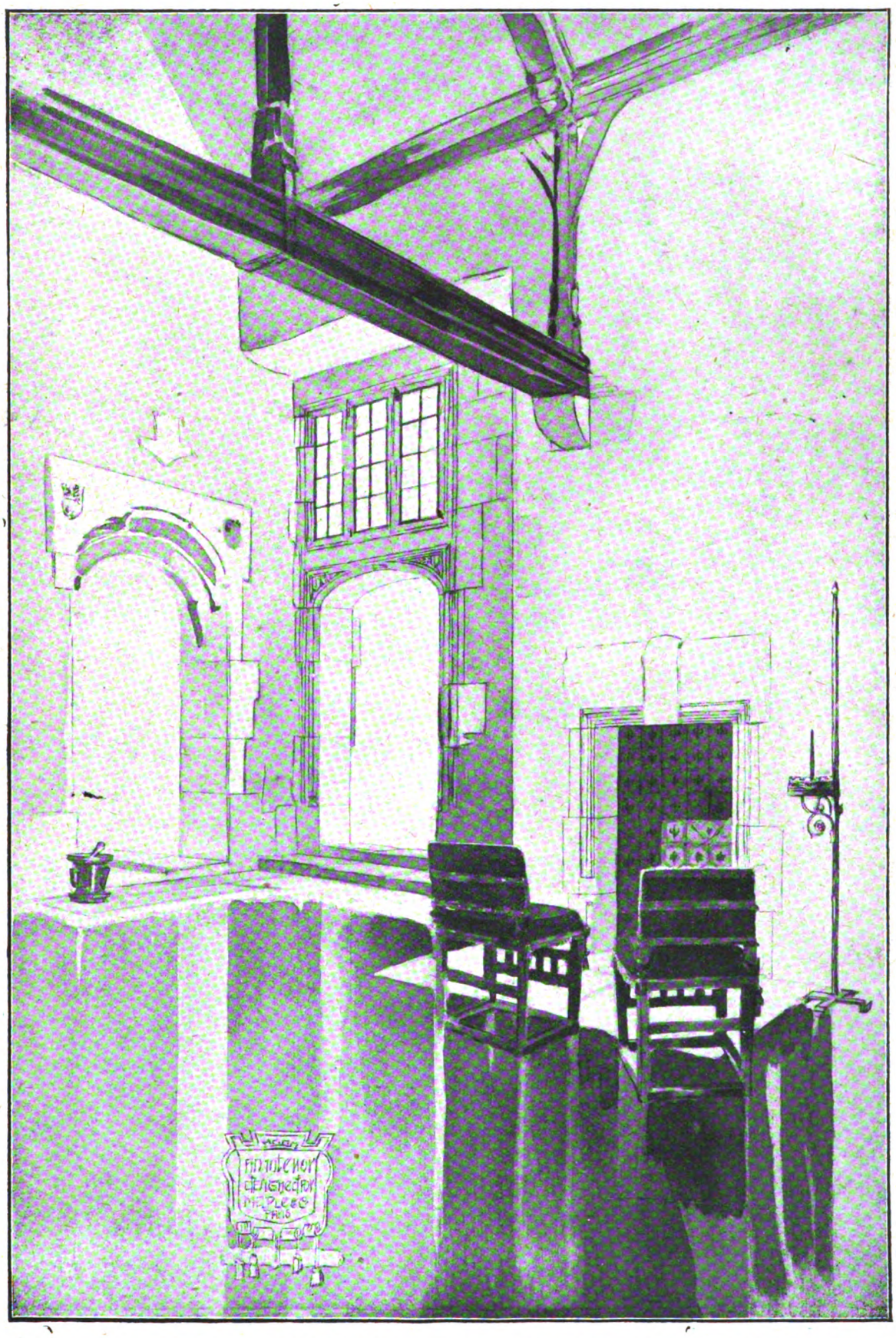

AN INTERIOR IN PARIS FOR MESSRS. MAPLE AND COMPANY.
Designed by Lieut. MURRAY ADAMS-ACTON.

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Our Illustrations.

THE CASTELLO AND PONTE S. ANGELO, ROME.

(The Winter Exhibition of Graphic Art, Royal Academy.)

We give this week a reproduction of an etching by Sir Ernest George, A.R.A., recently shown at the "Graphic Arts" Exhibition of the Royal Academy. The subject is the Castello and Ponte S. Angelo, Rome.

The castle was built by the Emperor Hadrian as his mausoleum, and it held the ashes (since scattered) of his family and succeeding Roman rulers. In the sixth century the Goths turned the building into a fortress, and it has since served as a stronghold and a prison both for Popes and for artists.

The bridge was built by Hadrian as an approach to his mausoleum, and it has been the subject of many vicissitudes. The ten colossal angels on the piers are from the designs of Bernini, but they have no claim to merit. This etching shows Sir Ernest George's present work, but his study for it was made some thirty years ago. The same artist's etching, in the same exhibition, of "The Bridge, Manresa, Spain," appeared in our issue of February 21 last.

BISHOP'S NEW THRONE, MANCHESTER CATHEDRAL.

Sir Charles A. Nicholson, Bart., the architect of this admirable addition to this great church, has obliged us by the following particulars:—

"The new Bishop's throne in Manchester Cathedral takes the place of one made in the last century, and is designed to harmonise with the ancient stallwork; the main lines of the canopies range with those of the old work, the spire and turret above the principal cornice serving to distinguish the throne from the stalls. The cathedral having only existed as such durmg recent years was not originally intended to contain a Bishop's throne, but the stalls are those of the ancient College of Our Lady, St. George and St. Denys. Therefore it has been thought desirable to isolate the throne instead of placing it close up to the stalls in what would be its normal position if the quire had been originally fitted up for cathedral instead of merely collegiate use, a plan which has the advantage of leaving the ancient work undisturbed and intelligible. As the new throne is a memorial to the late Bishop Moorhouse, formerly of Melbourne, the details, where possible, recall this association. Thus, there are representations of Melbourne Cathedral and the Bishops' Old College (St. John's, Cambridge) and emblems of a personal character, as well as those of the patron saints of the Collegiate Church. The throne was made by Messrs. E. Bowman and Son, of Stamford, and is of English oak throughout."

HOUSE AT HINDERTON NESTON, CHESHIRE.

This view shows the garden front of the same building, of which we gave the plans and entrance elevation in our issue of March 28 last, when a photograph of the entrance hall was also illustrated. The particulars in that issue embrace all that need be said respecting the house. Messrs. Briggs, Wolstenholme and Thornely, FF.R.I.B.A., of Liverpool, are the architects.

AN INTERIOR IN PARIS FOR MESSRS. MAPLE AND CO.

The open-timber roof framing of this roomy apartment is well in keeping with its mural simplicity, which accords with the masonry of its door openings and windows. The absence of cornices and the plain, severe arrangement adopted is well worth noting at a time when fashion in domestic work tends more and more towards the use of fanciful features after the manner of the Late Renaissance, in which Rococo ornament is favoured, combined with attenuated classic orders floridly Baroque on stereotyped lines. The work was commissioned by the Paris house of Messrs. Maple and Co., Ltd., of London.

SOME DUTIES OF A SURVEYOR.*

By A. ROTHERA,
(Member), Surveyor and Water Engineer, Spenborough Urban District Council.

No prophecy as to future events is made, the author contenting himself with placing before you a few points that arise in the duties of a surveyor, which present problems regularly happening, and upon which expressions of opinion are invited.

The Public Health Acts Amendment Act, 1907, was designed to help local authorities, and has succeeded in doing so in some cases, but various amendments conferring mutual advantages could be made in any Amending Act.

At all times a commonsense policy has to be exercised in dealing with owners and others, also members of our different Councils, and everyone has met that gentleman who demands Act, Section and Sub-section in support of any step taken by the surveyor. It therefore follows that although one may exercise wisely the policy mentioned, it is not much good at the critical period if not backed up by the necessary legal sanction. Take the question of the retention of disapproved plans for filing away, the author has always retained them, maintaining that if a plan is once deposited with the authority for their approval or otherwise, it belongs to them, and is the only connecting link of good or bad evidence of their action, should proceedings be taken. The retained copy can always be the medium for re-submission of the plan with the necessary alterations made in a different colour and an endorsement to that effect, which the author has allowed on several occasions. Up to the passing of the Act mentioned, which, by the way, is not an obligatory one, one had no authority save the case of Gooding v. Ealing Local Board, where the plaintiff sued for the return of a disapproved plan the judgment being in favour of the authority. The late Mr. C. Jones informed the author that the endorsement printed on the building notice, "This plan will be retained by the authority," helped them to win. No Act could be quoted private or otherwise, in support of the Local Board's action, but common sense prevailed, and is not this always good law?

Sections 15 and 16 of the Act are good ones, particularly the latter, although the word "shall" ought to have been printed instead of "may."

In the case of surface water drains from roads, there does not appear to be any Act governing its admission into streams, and in several cases in the author's experience, where roads run alongside rivers or streams, separated by only the fence and retaining wall, the drain from the gullies has been connected direct to the stream, the owner on the opposite side of the stream contending that a trespass had been committed and threatened legal proceedings, which never developed on a firm stand being made by the authority. The word "surface" covers a wide area, the rivers and streams drain all surfaces or take the water not absorbed direct to the stream, and the drainage from the road is only continuing the same natural law, only the surface is an improved or artificial one.

In the case in point the owner argued that the whole of the wall was his; when it fell a few months afterwards he asked the Council to re-build it, but not at his cost.

Take the case of retaining and fence walls alongside public roads. What help does a local authority receive from Section 31 of the Act quoted? The only case known to the author where the Local Government Board could have helped the authority, they deliberately gave a decision, after an exhaustive inquiry, which was altogether opposite to the evidence given and ocular demonstration, of the very grave danger that existed along an important main road by means of a ruinous fence, where the surface of the adjoining field was several feet below the road level. The verdict was helpful to neither side, but to make the place safe the County Council decided to do the work. There may be no Act or Order which defines the duties of a local authority in this respect, but as a general rule the fences above the road level where one serves as a protection, and the other as a retaining fence for earth above the road level, are repairable by the owner, and the retaining wall supporting the road is maintainable by the authority. That has been the author's practice, and generally he has had no difficulty in getting owners to do the work on the lines mentioned, but when a Government Department, which dominates municipal authorities, has a chance of giving a lead, it adopts a policy which gives no help whatever to the authority; such a department could give a neutral or unbiased opinion without any fear of an officer's position, but the "wait and see" tactics as a rule favour an owner, and is a deliberate "sprag" to the well-intentioned activities of many authorities. Cases will very likely be well known to members, where the Board have expressed the opinion that should the Council decide to go forward with the carrying out of works involving the remedying of insanitary conditions after notice to the owner, they will give an opinion after the work is carried out as to its legality, or whether it should have been done during the war—the best course would be to absolutely forbid it, and each party would then know their position.

The Acts governing the conversion of old buildings could with advantage to good sanitary conditions be considerably amended, and it is a disappointment that the 1907 Act did not give more help to an authority in this respect, seeing that it is a modern one—perhaps no surveyor had the opportunity of helping to draft it.

Take the section in the same Act governing the repairing or enclosing of dangerous places—the whole purport of this section is considerably weakened by the use of the word "may" instead of "shall," and most authorities refuse at once to proceed further, for this reason, unless a councillor has seen one or two stones tumble out of the wall. In matters affecting important and urgent matters of this character, the wording should be clear and definite, but how often is it otherwise?

Take Section 19 in the same Act. Can any member say whether they have done urgent repairs to private streets, and, if so, has it included "part" only? It may be that a few yards in length only needs attention, but can it be done by the authority under the section named? The Private Streets Works Act of 1892 mentions "part" or "parts," but opinions of eminent counsels put a different construction upon the strict interpretation of the words mentioned, that make it a gamble almost for a local authority to embark on the repair of "part" of a street—perhaps it may be argued that the point mentioned would be settled before the work was done, as mentioned in Section 7, but no help seems to be given in this respect.

Take Section 18 of the 1907 Act. What use is it to a local authority? The author prefers to do the repairs to the footpaths in his own district with his own workmen where a new crossing or entrance is concerned, and the contingency has still to arise where the section quoted would be of help to prevent the claim of domineering individuals who eloquently proclaim their rights as ratepayers in such matters.

The further sections of the 1907 Act dealing with the sanitary provisions are helpful to a surveyor in many ways, but in Section 39 (Sub-section 4) the clause dealing with the conversion of pail and privy closets ought to have been dealt with in a different way, and the fairest would be to make it half cost for the authority for the conversion of a pail closet, nothing to be allowed for the privy closet.

The testing of drains as laid down in Section 45 mentions for the first time in any Act of Parliament what tests may and may not be applied, and although the hydraulic test is the only sure one for the qualities of a good drain, and is used in most districts, the assistance of a surveyor in the drafting of the Act might have resulted in the suppression of the few words about the water test, resulting in considerable strengthening of our position towards securing a good job.

* From a paper read before the North-Eastern Section of the Institutions of Municipal and County Engineers at Cleckheaton.

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It may be of interest to some of the members to know the author's procedure with respect to the openings into public roads by private individuals; he does not refer to any company possessing a statutory right to do this work.

"Any contractor desirous of laying any drain, water pipe, etc., first makes a deposit and signs the forms provided before commencing the work, the amount necessary being determined by approximate lineal measurement of the surface disturbed, and marked against the different classes of macadam, etc., set out on the form, to which a rate of schedule price is affixed. At the conclusion of the work the exact length is measured by the foreman and only entered in the journal when the work is complete. Sometimes it is necessary for the contractor to pay an additional sum, or part of the deposit is returned. The author will be pleased to supply any member with a copy of the form should they think it will be useful.

The same form also serves for the provision of connections to all sewers, which are carried by the workmen in his department, a charge of 2s. 6d. being made for the work.

The returns made from re-instatement repairs have proved very lucrative in the past, for, save for companies, no work of this character has been charged for, and although the author cannot yet speak of his new district as to the returns, the receipts in his old one reached over £200 per annum, and an average of four years gave £160, or nearly equal to a penny rate.

By the method adopted, all openings are known to him—they, of course, may be to others—but he has the extra satisfaction of knowing they are all nearly paid for, and the oversight of them is not so much lost time so far as financial results are concerned.

Any meeting of surveyors held at this period should not fail to make some comment on the new Order recently made by the Local Government Board with reference to the use of studs for wheels of road locomotives, and it is hoped that it will be revoked soon after the declaration of peace. Attachments of this kind can do serious harm to road surfaces, by causing a fracture of separate stones at the point of impact with the stud, resulting in the loosening of the surface and internal attrition. It is hoped that on this important point the Institution will, at the proper time, bring the matter before the Board, with a view to having the Order revoked.

Touching on the question of road surfaces in a general sort of way, and the very wide use of tarred material, some very radical alterations will have to be made in the shoeing of horses if the real benefits its use should confer are really felt by a local authority. The laying down of a road of this description in most localities is hailed with delight by a very large section of the ratepayers, the minority, though in the category of having to bow to superior numbers, make up any deficiency, by the use of choice and very fluent language, directed at first against the surveyor, and as the work proceeds workmen live in a very black atmosphere throughout the day whilst doing the work, and when finished, the call for more chippings, grit, or sand to prevent horses "slipping" (so they say), but really so that the driver can continue in the same sweet way of smoking his pipe, riding in his cart, and talking to any companions he may see on his way.

Observations of roads during the bad labour conditions of last year, and when grit, etc., had been thrown on day after day, almost made the author think that it was an ordinary macadam road. In London, where a different method of shoeing is adopted, and where some surfaces are smoother than any he lays down, he always noticed that the grit thrown on is very meagre in quantity to that thrown on in the North Country towns—a contrast, one may venture to say, in favour of the different methods of shoeing practised in the South. Some time ago a competition organised by the Roads Improvement Association resulted in a good number of designs, and awards were made, a North Country shoeing smith, hailing from Harrogate, obtaining a prize, but no practical result seems to have developed in his district, the present methods not utilising the "frog" of the horse as Nature intended.

In closing a paper which is to some extent more of a general nature and a deviation from orthodox lines, a reference to the cumbersome methods of public health law may not be out of place. How many Acts have been placed on the Statute Book since 1875 the author cannot say, but it would be an undoubted boon to all public officials if a revision and re-modelling of the various Acts and Orders were made, and combined in a few volumes, arranged so that a reference could be made at once to a particular section, for any work in hand, upon which advice had to be given to an authority. The war has broken many traditions, and one of the biggest is the financial side: before it commenced no money could be spared for road developments and housing, but as it progressed or dragged on, the spending of millions to help to kill and maim would have made a much happier, healthy and delightful Great Britain, how we could have revelled in road widening, new roads, garden cities, etc., coming near to, or perhaps surpassing the pen picture of a city given to us in his famous book by that sanitary authority, the late Sir Benjamin Richardson.

OBITUARY.

Major Henry Macaulay, whose death has taken place at Kingston, was borough surveyor for thirty years, and was one of the pioneers of the Volunteer movement, with which he had been closely associated from its inception in 1859. He joined the 47th Rifle Corps at St. Helens in 1859, and on removing to Accrington in 1862 transferred to the 7th Lancashire Volunteers. Subsequently he was given a commission as lieutenant in the 5th Royal Lancashire Militia, afterwards the 3rd Royal Lancashire Regiment, and rose to the rank of major, retiring in 1887. He was one of the first to join the National Reserve, and although over eighty years of age he attended the drills and parades regularly. He designed and carried out the sewage disposal scheme for Kingston, and won the prize of £250 offered by the Peabody Trustees for the best design for their model dwellings.

We regret to record the death of Second-Lieut. Alfred Wyatt-Papworth, R.E., A.R.I.B.A., of "The Seasons," Hammersmith, who was killed in action on April 2. He was the younger son of the late Wyatt-Papworth, F.R.I.B.A., at one time Curator of the Soane Museum, and editor of the "Dictionary of Architecture." He was a member of the firm of Messrs. Gilbert H. Lovegrove, F.R.I.B.A., and A. Wyatt-Papworth, A.R.I.B.A., whose new building in the Nursery Training School, Golder's Green, we illustrated in our issue of September 6, 1916, and which was exhibited at the Royal Academy last year. The deceased was a citizen of London and a member of the Clothworkers' Company. The firm is largely concerned in the erection of mercantile premises in Shoreditch and the vicinity.

Mr. Charles Roper, of Scawfell, Constitutional Hill, Ipswich, Suffolk, retired builder (net personalty £565), has left £23,566.

The Bishop of Durham has dedicated a new pulpit, clergy and choir stalls at the Parish Church, Silksworth, as a memorial to the late Marquess of Londonderry.

Mr. Archibald Mathias Dunn, of Branksome Park, Dorset, formerly of Castle Hill, Wylam-on-Tyne, architect, a partner in Dunn and Hanson, who died on January 17, has left £36,820.

While a great many sites and buildings have been suggested to the First Commissioner of Works as suitable for the National War Museum, we understand that no decision has yet been come to. As collection and classification will occupy many months, at present no definite idea has been obtained of the space required for the housing of the exhibits.

Correspondence.

BRIBERY IN WAR TIME.

To the Editor of THE BUILDING NEWS.

Sir,—I hope your Editorial note in your last issue on the duty of honest men to familiarise themselves with the methods by which persons give and receive bribes will not be disregarded. The rogues know the law, and that they defy it so often with impunity is largely owing to the indifference, or lack of courage, of the public. There was before the war, as Sir Edward Fry once said, "a considerable number of persons who speak leniently, almost kindly, of the evil in question for various reasons, some due to a personal interest, and some to a kind of stupid good nature which thinks more of the gratification of the recipient than of all the evils resulting from the practice." It came as a shock to many that the crime increased with the War—as a matter of fact there have been twice as many cases since August 1914 as there were in the previous 7½ years—and public opinion undoubtedly approves the severer penalties provided in the Act last session. But it is more important that there should be frequent detection of crime than occasional heavy penalties, and all those who come across cases of bribery should communicate in confidence with me.—Yours faithfully,

THE SECRETARY.

Bribery and Secret Commissions Prevention League, Incorporated.

9, Queen Street Place, London, E.C.

P.S.—I shall be pleased to send a copy of the League's *News-sheet* to any of your readers.

PROFESSIONAL AND TRADE SOCIETIES.

THE ARCHITECTURAL ASSOCIATION OF IRELAND.—A meeting of the President and Committee of the Architectural Association of Ireland was held at 15, South Frederick Lane, Dublin, last week. Mr. R. G. Leask, the President, occupied the chair. An interesting lecture was given by Mr. A. M'Googan, entitled "The Rise and Progress of Water-colour Painting." The lecturer pointed out that, prior to the introduction of oil colours, about the middle of the fifteenth century, all painting, broadly speaking, was in water colour. Water-colour painting was practised by the Egyptians 3,000 years B.C., and was still to be seen in use in our theatres by scene painters. The art of missal illumination, in which Ireland greatly distinguished itself in the seventh century, and its off-shoot, the art of miniature painting, both belonged to the art of water colour. Having dealt with the development of the art to modern times, the lecturer referred to a number of distinguished Irish water-colour painters, including Dr. James Moore, a successful Ulster surgeon, who devoted all his leisure time to landscape painting in water colours.

Mr. William Ninham Crowhurst, of Richmond, Surrey, builder, has left £22,114.

The home of Private W. Ramsey, at Bebside, Northumberland, having been destroyed by fire, the people of the village are raising the £70 needed to replace the loss. Ramsey is at the front.

The death is announced, of wounds, on April 4, of Second-Lieutenant Hubert de Zoete Collier, Manchester Regt., aged 21, son of Mr. Robert Collier, F.R.I.B.A., and Mrs. Robert Collier, 25, Woodstock Road, Bedford Park, W.

The new extension of the Bakerloo Railway from Willesden Junction to Watford was opened on Monday. This is the sixth extension of the railway since its inception in March, 1906. The previous extensions were between Westminster Bridge Road and Elephant and Castle, in 1906; Baker Street and Great Central, 1907; Great Central and Edgware Road, 1907; Edgware Road and Paddington, 1914; Paddington and Queen's Park and Willesden, in 1915. After coming to the surface at Queen's Park, the Bakerloo trains will run over the electric line of the London and North-Western system to Watford, via Willesden Junction New Station.

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Our Office Table.

"Vegetable Culture for All," taught in twenty-six chapters, by Eva (Herbert Jenkins, 2s. net), is a pretty book, plainly and practically written, by one who knows what is wanted to-day in gardens and allotments. The author is a gardening expert, who herself grows the things about which she writes with such charm and comprehension. As she says, "Mother Earth is anxious to produce"—a fact to which we are now, at long last, being awakened by the War. Beginning with a really grime chapter "On Ground Work," in which truths are told truthfully, pithily, and pointedly, the author bids her readers put their backs into it if they want to do anything. Many short, sharp hints are given as to what to do and what not to do, such as, "Get into a cleanly habit of working, but pray don't shudder at *outdoor* dirt." After all, the work is the thing; the rest is hope for the harvest. The book deals briefly and boldly with all the usual vegetables—potatoes, beans, peas, parsnips, cabbages, cauliflowers, carrots, celery, onions, and the rest. Written in a strong, simple, and entirely straightforward way, and freely illustrated with drawings and diagrams, the work will really teach those who read it and act upon its lessons of experience how to raise a good crop of vegetables on their bit of ground. Besides culture, Eva deals with cookery throughout, and ends with a special chapter on the cooking of vegetables, a thing not so easy as it looks, and which, with its honest and homely hints, should be read by all carefully.

At the last meeting of the Macclesfield Education Committee the minutes of the School Accommodation Committee stated that the report of Mr. A. R. Wood, of Tunstall (of the firm of Messrs. Wood and Goldstraw, architects), upon the safety of the Trinity Square school premises, had been submitted, and that it was resolved that a copy of Mr. Wood's report be forwarded to the chairman of the trustees of Trinity Square school, and that the trustees be asked to say whether, in order to secure the safety of the building, they are in a position to carry out the requirements of Mr. Wood.

At the bazaar for the benefit of blinded soldiers and sailors which is to be held next month at the Albert Hall, the contributions of artists will be rendered in a new way. Hitherto, though artists have given their pictures generously to the aid of war charities, the results have often been incommensurate and unsatisfactory to artists themselves. Pictures have been sold for prices below those at which the individual artist usually sells his work; frequently they have been sold for very small sums or not sold at all. The Albert Hall scheme has been devised to lessen these drawbacks. Permission has been obtained from the Board of Trade to hold a lottery of the contributed pictures. The pictures at the Albert Hall, though on view, will not be for sale; but lottery tickets at the price of 5s. each will be sold at the artists' stall. Thus for 5s. a purchaser will have the chance of obtaining a Nicholson or an Orpen—both are sending pictures—and, in any case, will have contributed 5s. to a war charity. At the same time, no artist will be wounded by feeling that his picture has gone for less than he thinks it is worth. Artists are well satisfied with the scheme, and pictures are coming in fast.

When Tennyson, in his lines on the jubilee of Queen Victoria, bade "The patriotic architect" raise as a memorial "some Imperial institute" which should "speak to the centuries," remarks the *Birmingham Daily Post*, he did not dream of that building being put just thirty years later to a use strikingly in consonance with his imaginings. Yet that was the case yesterday afternoon, when a reception was given in the Imperial Institute by the Royal Colonial Institute, the British Empire League, the Victoria League, the British Empire Club, and the Overseas Club in honour of the representatives of the Dominions and India at the Imperial War Conference, all of whom were present, and a large and influential gathering assembled.

There has been hung in the north-west tower of Ripon Cathedral a painting by Streator, Sergeant-Painter to King Charles II. It was painted as a reredos for the choir about the year 1663, and represents an Ionic temple. The following reference to the painting is found in Celia Fiennes's famous book, "Through England on a Side-saddle in the Times of William and Mary":—"The town stands on a hill, and there is a good large stone-built church, well carved; they call it a Minster. There is a very fine painting over the Altar. It looks so natural, just like real crimson satten, with gold ffringe-like hangings, and severall rows of pillars in isles on either side, which looks very natural." The painting was put away in one of the towers in the days of Blore, the architect, who erected another reredos in its place. It has now been brought out by the Dean and hung in the north-west tower as an interesting piece of scene-painting of the period.

The Building Trades Central Advisory Committee (Operatives), recently appointed to advise and assist the Ministry of Labour upon matters affecting workmen in connection with the employment exchanges, held their second meeting last Wednesday. There were present Mr. C. F. Rey (Director of Employment Exchanges) (in the chair), Mr. J. Batchelor (Operative Bricklayers), Mr. W. Bradshaw (Operative Stonemasons), Mr. F. Chandler (Amalgamated Carpenters and Joiners), Mr. Charles Ince (Builders' Labourers), Mr. J. Parsonage (Amalgamated Painters), Mr. J. Vickers (heating engineers), Mr. W. Wentworth (Woodcutting Machinists), and Mr. R. Wilson (Operative Slaters). The committee considered the following questions, among others:—The recent decisions by the umpire with regard to the disallowance of benefit to men who refused jobs, either in another district or in a new trade; the recommendations of the Treasury Committee on the audit of unemployment benefit of associations having arrangements under Section 106 of the National Insurance Act, 1911, with special reference to the recommendation that vacant books should not be kept on licensed premises, and that standard vacant books returnable to the department every quarter should be used by all associations; the best means of expediting the placing of men sent from one town or district to another by the exchanges.

Canon Astbury, presiding over the Easter vestry of Smethwick Old Church, mentioned that in a short time the bicentenary of Dorothy Parkes, the lady who built the church and endowed the benefice, would be commemorated. He thought something should be done to mark the event, and suggested that, in view of the great increase in the population in the district, a scheme of church extension should be inaugurated. Two proposals had been put forward, one for the erection of a new church and the other for the enlargement of the present building. He added that when Dr. Gore was Bishop of Birmingham he suggested that the present church be pulled down and a magnificent one built in its place. He (the speaker) however, thought there was so much sentiment attached to the old church that the residents would not agree to that. The vicar mentioned that the churchyard extension, in connection with which there had been an outlay of £1,200, had been completed, and there was a balance of £200, which had been invested in the War Loan.

In view of the increasing shortage of imported soft wood, the Army Council have made an order under the Defence of the Realm Regulations which will have the effect of limiting very strictly the use of wood for purposes which are not of national importance. A merchant's monthly sales to consumers will now be limited to an amount not exceeding 1 per cent. of his stock as it stood on April 1 unless his customer can produce a permit signed by the Director of Timber Supplies.

A further relic of Cloth Fair has been forwarded by the City engineer, on behalf of the Sanitary Committee, to the Guildhall Museum. It consists of a carved stone shield of the arms of the Rich family, taken from the front of No. 22, now demolished. In 1547 the Priory of St. Bartholomew, with the ground enclosed in its precincts, and all rents pertaining thereto, was purchased for £1,064 11s. 3d. by Sir Richard Rich, Chancellor of the Court of Augmentations, and afterwards Lord Chancellor and first Baron Rich. Shortly after that date the open spaces of the Priory were covered with houses, of which the picturesque but insanitary old buildings now being demolished formed part. In Cloth Fair Rich built himself a town house, and upon the front of it at a later date the arms of his family were placed. The date assigned to the relic now preserved is about 1680.

An old-time Suffolk inn, "The Live and Let Live," at Coddenham, forms the subject of a contribution to the proceedings of the Suffolk Institute of Archæology and Natural History, by J. S. Corder. The licence for the inn was recently extinguished, and the building has been divided up into tenements and let as cottages. This old house, which dates from the fifteenth century, stands in the centre of the village, in a street just past the church on its northern side. It consists of a long two-storied building, at the end of which is a projecting wing with a gable end intersecting the main roof. The fabric is strongly constructed of oak, with clay daub filling, standing on a base of brickwork and masonry, the roof being covered with plain tiles. The upper floor overhangs the lower story, and is carried on beams supported by uprights, having pilasters with ornate caps and bases, from which spring moulded brackets. Originally all the timber construction showed externally, but later, probably about the seventeenth century, it was covered with pargetting and ornamented with geometrical designs in low relief. Remains, however, of the old Tudor-headed windows can be observed at the western end, and the oak beams and other constructive details are visible inside, so that it is not difficult to reconstruct the original disposition and size of the rooms. The building may have been an ancient hostelry in the days when the church was served by the Priory of Royston, the great tithe of Coddenham parish having been granted at an early period to that priory. At the Dissolution the tithe passed into other hands, but was restored to the vicars of Coddenham some 150 years or more ago.

At a lecture given at Carpenters' Hall, London Wall, on Wednesday, April 4, Professor William Somerville condemned the system of allowing so much room for trees that they could grow large, low branches with shoot boles. For commercial purposes it was necessary to plant them close, so that they had to shoot up with straight boles to a considerable height. A strong public opinion existed in this country in favour of an improved system of afforestation, yet between 1905 and 1913 the forest area of England had been reduced by 15,000 acres, of Scotland by 16,000 acres, and of Ireland by 5,000 acres. Less than 4 per cent. of the three kingdoms was under timber.

Owing to the serious damage caused to the tapestries at Hampton Court by dust, metal mats have been placed outside the Great Hall and State Apartments, and a printed notice is shown requesting visitors to wipe their feet before entering.

A new way of clearing out foul drains has been found, according to *Capital* (Calcutta). A young crocodile was put into a drain with a cord round its waist. On emerging, the cord was taken off and was used to pull a knotted chain through. It is not stated how the beast was kept moving.

The Scottish National Housing Co., Limited, presented plans at the Dunfermline Dean of Guild Court last week for the erection of another 1,000 dwelling-houses at Rosyth. The town clerk (Mr. John L. Jack) pointed out that the petition represented an expenditure of £400,000, and was probably the largest which had ever been presented to a Dean of Guild Court in Scotland. Subject to certain alterations suggested by the burgh engineer being given effect to, the court passed the plans, together with plans for the formation of fifteen streets.

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TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

RECEIVED.—E. B. D.—J. G.—E. H. S. and Bros.—T. R. B. and Co., Ltd.—B. and D.—P. C. B. and Co., Ltd.—C. Bros.—C. P. and Co.—J. O. and Sons, Ltd.—B. M. S. S.—H. R. W.—R. and Sons.

J. R. S.—No.

D. H. H.—Thanks; yes.

ASTRA.—Too metaphysical to interest many.

REDUX.—Many in previous volumes. Naturally little is doing just now.

DISAPPOINTED.—Sorry; but as we have repeatedly warned all readers, unless this journal is ordered of your newsagent to be supplied weekly, or subscribed for direct to the office—in which case you will get it sent post free—there is no help for it. You do not seem to grasp the fact that, quite apart from the increase to prohibitive prices in the cost of paper, we are only allowed to buy *one-half* of what we were using last year; and that, almost immediately, no newsagent will be allowed to send back unsold copies.

Mr. William Henry Webster, of King Street, Lincoln, retired joiner, who died on January 23, left property of the value of £7,182 19s. 4d., with net personalty £4,690 19s. 5d. The testator gives £100 a year and the use of a house and furniture to his wife; any property passing to him from his late brother, to his nephews and nieces; and houses and land and other property to his brothers Joseph and Fred.

TO ARMS!

1st LONDON ENGINEER VOLUNTEERS.

Headquarters, Balderton Street, Oxford Street, W. Orders for the week. By Lieut.-Col. C. B. Clay, V.D., Commanding.

OFFICER FOR THE WEEK.—Platoon Commander A. Gerard.

NEXT FOR DUTY.—Platoon Commander H. de P. Birkett.

MONDAY, APRIL 23.—Technical for Platoon No. 9, at Regency Street. Squad and Platoon Drill Platoon No. 10. Signalling Class. Recruits Drill, 6.30-8.

WEDNESDAY, APRIL 25.—Instructional Class, 6.15. Platoon Drill Platoon No. 2.

THURSDAY, APRIL 26.—Platoon Drill Platoons Nos. 6 and 6. Ambulance Class by M.O., 6.30. Signalling Class.

FRIDAY, APRIL 27.—Technical for Platoon No. 10, Regency Street. Squad and Platoon Drill No. 9. Recruits Drill, 6.30-8.30.

SATURDAY, APRIL 28.—N.C.O.'s Class, 2.45, under Capt. Bentley and the Instructor of Musketry.

SUNDAY, APRIL 29.—Special Work at Bombing School. Parade Clapham Junction Tube Station (City and S. L. Ry.), 9.45 a.m. Uniform, haversacks, water-bottles. Midday rations to be carried. As this work is very important, the Commandant would like to see much larger Parades.

MUSKETRY.—For all Companies. See notice at Headquarters.

NOTE.—Unless otherwise indicated, all Drills will take place at Headquarters.

By Order,
MACLEOD YEARSLEY,
Captain and Adjutant.

April 21, 1917.

Lower Lumb Mill, in the Colden Valley, Hebden Bridge, has been sold by Mr. Wm. Sutcliffe, Sandal House, Heptonstall, to a Manchester firm, whose intention is to raze it and carry away the fine white stone and blue slate for rebuilding purposes elsewhere. These materials are at present very costly through the ordinary channels, and nearly unobtainable.

The Conciliation Board for the building trades on Tees-side has issued an award under which bricklayers, joiners, and stonemasons are given an additional war bonus of ½d. an hour as from May 1, and a further ½d. an hour as from June 1, making the wages for joiners and bricklayers 1s. per hour, and for stonemasons 11½d. Machinists' wages have been fixed at 42s. per week, plus 4s. war bonus, and sawyers 39s. 6d., plus 4s.

LIST OF TENDERS OPEN.

BUILDINGS.

April 20.—Re-covering a portion of the roof of the Sutherland Institute, Longton; and alterations at the temporary premises occupied by the fire brigade, Stafford Street, Hanley.—For the Corporation of Stoke-on-Trent.—Borough Surveyor, Town Hall, Stoke-on-Trent.

April 25.—Erection of a Bungalow.—For Mr. G. Hunter.—Specifications, plans, etc., from architect, Mr. O. Hocking, The Acorns, Rettendon, Chelmsford.

ENGINEERING.

April 30.—Installation of a Vacuum Steam-heating System, and Supply and Erection of Powerhouse Buildings and Chimney.—For the Canterbury University College, Christchurch, N.Z.—The Registrar of Canterbury College, Christchurch, N.Z

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

ROADS AND STREETS.

April 23.—2½-in. and 1-in. Tarred Slag, 2½-in. Whinstone, and 2½-in. Dry Slag, to be delivered to Arksey and Carcroft, G.N.R., and Bentley Road, H. and B. and G.C.R. stations respectively.—For the Bentley-with-Arksey Urban District Council.—R. G. Whitley, A.M.I.C.E., Engineer and Surveyor, Council Offices, Bentley, Doncaster.

April 24.—About 230 tons of 1½-in. and 315 tons of 2-in. Granite, to be delivered free at Hadleigh, Suffolk, railway station, between May 15 and June 15.—For the Hadleigh Urban District Council.

April 30.—Materials and works for re-surfacing a roadway with asphalte macadam.—For the Battersea Borough Council.—W. M. Wilkins, Town Clerk, Town Hall, Battersea.

SANITARY.

April 25—May 9.—Supplementary Works of sewage disposal to be carried out at existing outfall works at Limpsfield and Oxted.—For the Godstone Rural District Council.—E. A. Head, Clerk to the Rural District Council, East Grinstead.

STORES.

April 21.—Sluice Valves, Fire Hydrants, Special Castings, Maincocks, Blacksmith Work, Ironmongery Goods and Sundries (One Year from May 15).—For the Dundee Water Commissioners.—W. H. Blyth Martin, Clerk of the Commissioners, City Chambers, Dundee.

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THE PORTLAND CEMENT INDUSTRY

A PRACTICAL TREATISE on the Building, Equipping, and Economical Running of a Portland Cement Plant with

NOTES ON PHYSICAL TESTING, by WILLIAM ALDEN BROWN, Assoc. A.M. Soc. C.E.

Member South Wales Institute of Engineers: *formerly* Assistant Superintendent Cowell Portland Cement Company, Cowell, California, U.S.A.; Works Manager Burham Portland Cement Company (Associated Portland Cement Manufacturers); Works Manager Aberthaw and Bristol Channel Portland Cement Company, South Wales.

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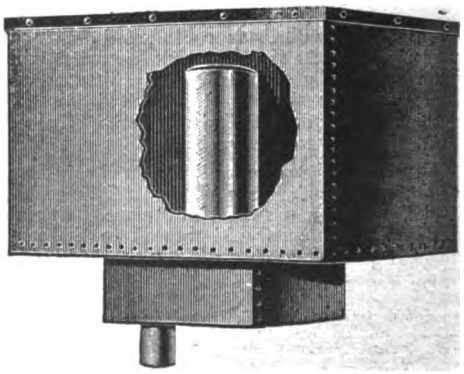

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April 25, 1917. Volume CXII.—No. 3251.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.2.

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OUR ILLUSTRATIONS.

Church of St. Mary and All Saints, Potters Bar, Essex. View of Chancel from South Aisle. Photographed by Mr. Thomas Moreland. Mr. J. S. Alder, F.R.I.B.A., Architect.

The New Sorbonne, Paris. Cour d'Honneur, East Elevation. M. Henri Paul Nenot, R.I.B.A., Royal Gold Medallist, 1917, Architect.

Gateway of the Castle, Maniaces, Syracuse. Pen and ink drawing by Mr. F. Hamilton Jackson, R.B.A., from the Royal Academy Winter Exhibition of Graphic Art.

Chimney Piece, Royal Exchange, Edinburgh (formerly known as John's Coffee House). Details of the carved frieze and a general elevation with plans. Pencil measured sketches by Mr. Stewart Sim.

Currente Calamo.

It was stated in the "Globe" last Thursday that: "Opposition to the S.E. and C. Railway's Charing Cross Bridge scheme has been withdrawn by the Royal Institute of British Architects and the London Society." That is not so, as will be seen from the statement in the forthcoming annual report of the R.I.B.A., in which the present position of the Joint Committee of the Institute and the London Society is thus stated by the Council of the R.I.B.A.:—

"In the session of 1916, the Institute, in conjunction with the London Society, successfully petitioned Parliament against the South-Eastern Railway Company's Bill, the passing of which would have the effect of retaining the unsightly railway bridge at Charing Cross and of deferring indefinitely the proposal for the much-needed road-bridge across the river at this point. The Bill is again before the present Session of Parliament, and the Institute and the London Society have again petitioned against it. The Bill, however, has passed the second reading, and has been referred to a Committee of the House of Commons. It is intended to keep the Joint Committee of the Institute and the London Society in being with a view to their keeping in touch with the subject and taking such action as may be deemed expedient in case of further developments."

As all readers know, the suggestion put forward on behalf of the Institute and the London Society for a great Imperial Bridge carrying road traffic over the Thames at Charing Cross, has met with almost unanimous support from all parties both in the House and out, and it is hoped that the widespread public discussion on this great project may yet bear fruit. The Charing Cross Bridge Committee has held twelve meetings, and all thanks are due to the Rt. Hon. John Burns, M.P., who has been indefatigable in his efforts to secure a real public improvement of the metropolis of the Empire.

Mr. Kingsley Wood seems the only man with any real knowledge of the Insurance Act who has the courage to speak out in reference to the miserable failure of all concerned to provide sanatoria in London for the 150,000 disabled sufferers who were promised magnificent palaces and the rest of the blessings of the Insurance Act so glibly by Mr. Lloyd George. At the assembling of the deputation which waited last Wednesday on the National Health Insurance Joint Committee to urge the proper provision of sanatorium benefit, Mr. Kingsley Wood said the sanatorium benefit had proved one of the greatest disappointments, instead of one of the greatest benefits as regarded by Mr. Lloyd George. It was largely owing to the short-sighted policy of the Treasury, as the result of which many millions would have to be spent. Consumption was now as widespread in London as smallpox was in the eighteenth century, and disabled 150,000 persons each year. The funds provided were wholly inadequate, and two-thirds of the consumptives in London applied too late. Sir E. Cornwall said as to the Sanatorium Fund being insufficient, the funds for all great social problems were insufficient. How that can be when the workers and their employers are taxed to find the funds which the State was to supplement, but which are being spent freely otherwise, we do not know. As Mr. Kingsley Wood replied, it is only necessary to look at the waiting list to see that the insured are not getting value. If any private insurance company accepted a premium and then told the insured person to wait because they had no funds a jury would say that the insured person was being swindled. And, ere long, the people of this country will give a similar verdict.

It is a noteworthy confirmation of Mr. Kingsley Wood's statement that tuberculosis—not smallpox—is the disease which is decimating the people, and that while Mr. Lloyd George's glowing visions of sanatoria are still as far away in the clouds as the millennium, we are spending money on smallpox hospitals at the rate of one hospital to one patient! Some discussion took place at the last Easington Rural District Council meeting in regard to the position of the council in relation to the Easington and Sedgefield Joint Smallpox Hospital Board. The main point raised was in regard to the expense incurred by the council. Mr. J. J. Best said that fortunately they had only had one patient since the hospital was built, but it was better to spend money in preventing a disease than having to spend more money afterwards to counteract it. The whole question was referred to the Joint Hospital Committee. We do not know what the smallpox hospital is costing the ratepayers, or to what extent tuberculosis prevails in the district which it controls. Possibly, if the far more fatal malady is prevalent, it might save lives to divert the hospital for a time from its original purpose and utilise it for one which is so urgent?

The wholesome letter in the leading dailies signed by ten influential members of Parliament denouncing the present prodigal expenditure of the Government, which is almost uncontrolled by the House of Commons, and which is fast hurrying us along the road to national bankruptcy, has, we trust, been carefully studied by all really patriotic people. It is every day more and more evident that this new national luxury of Government State Departments will, if it continues, smother the State. Their number grows fast, and the cost comes out of the pockets of the taxpayers, and the blunders that are being made are many and frightfully costly. The practical question is: What can the House of Commons do to help the Government to meet the difficulties which the war has brought? Ministers in the late and in this Government paid and pay lip-service to economy. In reality few care. Control over expenditure by the House of Commons has practically gone. The House of Commons at present is helpless. The Government have decided to rule without the House of Commons. The Treasury has waived its control; most departments are a law unto themselves, and no one interposes to check their expenditure. Several subtle psychological influences which were a check on expenditure in the past have disappeared. For instance, the Government of the day does not require to raise by taxation the necessary revenue; instead, the money is borrowed. The foundation of the House of Commons is control of expenditure, but the necessary knowledge is deliberately withheld. Without knowledge control cannot be effected. Without discussion the present position cannot be remedied. Publicity in these matters is not a danger, but a safeguard. Honest finance can never be achieved without publicity. Obscurity and lack of knowledge cover up mistakes and enable these mistakes to be repeated. What is needed is a check *to-day* to conserve our resources and enable the nation to stay the course. It is time the whole country rang with a demand for it.

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Many of us are asking whether the museums in Berlin and other enemy cities are to be permitted to retain after the war their ill-gotten spoils. There is evidence that the opportunities of the last two years and three-quarters have been utilised to acquire specimens for the aggrandisement of the German national and private collections by illegitimate means. Mediæval work from the French and Belgian chateaux, parcels of books and specimens from local museums, and the like, have been removed to Germany on the plea that they needed protection. Their restoration to their proper owners should be sternly insisted on. A direct precedent for such a course was created in 1815, when Prussia led the way in demanding the return from the Louvre of all the art treasures Napoleon Bonaparte had collected from every country he had invaded. Talleyrand resisted the claim to the utmost, but he was told by Wellington "the hour of retribution had arrived, and the allied Sovereigns could not permit such an opportunity to pass for giving a great moral lesson." Another great moral lesson should be taught now up to the hilt.

Lord Selborne, who is an authority on the subject, altogether apart from the fact that he has filled the Presidency of the Board of Agriculture, intends to raise the question of afforestation in the House of Lords. He will inquire of the Secretary for War the personnel, powers, and duties of the officers possessing an acquaintance with forestry who are officially recognised as the agency for selecting areas and negotiating prices for home-grown timber, as well as for the names and duties of the Ministerially promised Advisory Committee of landed proprietors. Lord Selborne will next ask for a definition of the relationship between these officers and landed proprietors on the one side and the Director of Timber Supplies and his staff on the other, and will press for a statement as to the procedure the new Timber Committee proposes to adopt regarding the acquisition of home-grown timber. An interesting and informing debate should ensue if these questions are persisted in.

Law, like most of us, is not rich in these days, but those who smile at the not infrequent renewals of the always shabby roadway of the court that separates the main building of the Law Courts and the more recent extension wonder also sometimes if once and for all it was covered with a decent bit of Claridge's asphalte or granolithic, the money would not be saved, and the heroic exertions of the men who naturally pick a nice pasty day for spreading and rolling the patches of gravel which shine in the April sunshine with the radiance of pease pudding. Last Thursday we robbed the law of several layers of gravel and left it gradually from our boot-soles across the road as far as Effingham House. It is considerate, no doubt, to spread the stuff opposite the Judges' entrance; but, unlike their hearts, it takes a long time to harden, and some of them would probably prefer a clean and dry landing-place from their broughams and motor-cars, although the proverbial kinship of law with dirt and cobwebs might forbid such an admission. Just as a war memorial might we not head a modest subscription for a decent pavement and lend out the roller, which mostly rusts inside the gate, gratis in turn to any members of the Bench and Bar who are busy in their allotments?

The heading of the case given on p. 371 is not ours, but that of the *Morning Post*, to which journal we are indebted for the report. Anyhow, builders are still contributing liberally to the revenue in fines under the Defence of the Realm Act, the two concerned and the building owner having been fined £100 between them for doing work estimated to cost £1,400 without a licence at a house purchased for £17,500. Not a very "luxurious" sum, if the house wanted thorough repair. The share of Messrs. Howell J. Williams, Limited, was only £320, for a little finer work at the building owner's risk. Of course, had it all been for the accommodation of German prisoners or conscientious objectors it would have been done by Government, and presumably no licence would have been necessary. The case is hardly one likely to facilitate property sales just now.

THE NATIONAL PORTRAIT SOCIETY.

The National Portrait Society's Exhibition at the Grosvenor Galleries is numerically a strong one, thanks partly to the fertility of some of its contributors. Mr. Ambrose McEvoy, for instance, heads the list with no less than fourteen exhibits, some of them good, but most of them, to our thinking, hardly satisfactory as "portraits." Still, such a number and variety of commissions, perhaps, proves that sitters are of quite another mind, and prefer to be painted in the increasingly persistent fashion, as more or less successful illustrations of artistic fancy rather than faithful representations recognisable by their friends and acquaintances. What her friends and admirers think of the lady in "Blue and Gold" (22) we cannot guess; or whether "Daphne" (37) or "Calypso" (46) have really their prototypes in the flesh we may have our doubts; the more so that there are others in which Mr. McEvoy has not disdained the perhaps more commonplace but certainly more orthodox manner.

Mr. Augustus John is somewhat similarly—let us not say unequal, but, rather, diverse in his treatment of his sitters, the most fortunate of whom is certainly Mr. Charles Slade (42), a really excellent piece of work, which leaves the beholder with an abiding memory of the sitter, even though he may never have seen or known the person painted. Certainly, if fate had decreed our own participation, or that of any one dear to us, in the immortality that is secured to future generations of old masters from Mr. John's brush, we should prefer so to be handed down to posterity than in the comparatively curt treatment vouchsafed to 36 and 34, or invested with the charm, real or unreal, of the lady in 24.

Another really good portrait is that of the late Charles Booth (34) by Prof. William Rothenstein, perhaps the very best in the exhibition. It is almost a perfect realisation of genuine absorption by the artist in the characteristics of his sitter, with the result that a portrait worth the name has been achieved free from all eccentricities, and one which all who knew its subject will value more and more as time passes.

Another fine work is "Louise" (13), by Mr. Alvaro Guevara. There is no exaggeration, we fancy, of the characteristics of the sitter, and certainly no meretricious softening thereof; but there will be not a few who will rank it as one of its author's best achievements, and may, very possibly quite rightly, accord it the place of preference in the whole show.

Mr. William Nicholson's two portraits "Edward Knoblock, Esq." (12), and "Norman Holder, Esq." (25), are both well worthy of his reputation. We prefer the former, and remember, perhaps, still more successful efforts; but both rank far and away above most on the walls.

Mr. P. A. de Laszlo has been fortunate in his subjects, and has done all of them justice. "Miss Diana and Master Joe, children of the Rt. Hon. Austen Chamberlain" (64), are two charming children, but it is the young lady that inherits the "steely" eyes of her grandfather. "Her Grace the Duchess of Wellington" (67) and "His Excellency Dr. W. Hines Page, the American Ambassador" (69) divide the honours, though the latter may possibly monopolise public interest.

Mr. John Lavery, A.R.A., has three canvases, all well up to his usual high average. The best is "Viscountess Massareene and Ferrard" (8); the others are "Miss E. Constance Jones, D.Litt." (2), and "Captain Samuel" (45).

Mr. Jacob Epstein exhibits several good busts, including one of "Admiral Lord Fisher" (47), of whom, by the way, Mr. Augustus John has a portrait in oil (36), himself appearing in bronze (51) by Mr. Epstein, and again in another by Mr. F. Derwent Wood (50). Mr. John must surely have aged a dozen years when he sat to Mr. Epstein, or Mr. Derwent Wood has put the clock back as many. Of Mr. Epstein's solitary effort in oil, "Mrs. Lindsell-Stewart" (182), we can only say that it is hardly a satisfactory experiment.

Mrs. Laura Knight has six exhibits, the most important of which is "Mrs. Kay" (96). Mr. R. G. Eves sends seven. "General Sir Alfred Turner, K.C.B." (27), is deservedly well placed. Mr. Borough Johnson has three, "Madame Levinskaja" (4), "Rev. James George" (15), and "The Green Feather" (33). Mr. Harold Knight has secured the place of vantage with his "Portrait of the Painter" (1), and also shows "A General's Daughter" (17), and "Mrs. Alfred Sidgwick" (142).

Besides the bust of Mr. John, mentioned above, Mr. F. Derwent Wood has three other bronzes, and one bust in marble of "The Late Henry James" (116). Of three similar exhibits in the corridor a relief portrait in plaster of "Miss Elinor Waters" (239), by Mr. George F. Waters, is the best.

ROYAL SOCIETY OF PAINTERS IN WATER-COLOURS.

The 168th exhibition of the Royal Society of Painters in Water-Colours is quite an average one, though we miss the contributions of more than one of its leading Members and Associates. Mr. Alfred Parsons, R.A., the president, has four exhibits, "The Snow" (22), "May Tulips" (112), "Chinese Pæony" (125), and "Peach and Plum Blossom" (126a). Mr. Arthur Hopkins, the treasurer, sends seven, the two best, "A Drink by the Roadside" (16), and "The Passing of the Shower" (36).

There are five of the late Reginald Barrett's pictures, all more or less of architectural interest, and "A Renaissance Doorway, Venice" (116), especially. One,

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"The Citadel of Cairo from the Nile" (141), is unfinished.

Mr. Henry S. Tuke, R.A., leads the catalogue with a spirited marine piece, "A French Barque" (1), and has two others, "A Sun Lover" (75), and "Going Aloft" (108). Of Mr. D. Murray Smith's six pictures we like best "On the Avon, Christchurch" (2). Mr. James Paterson, R.S.A., is best, perhaps, with "Ypres Castle—Rye" (3), but of the other four none will pass "Rowallan Castle—Autumn" (143) unnoticed. Mr. Edwin Alexander's "In a Highland Deer Forest" (37) is so good that all will regret it is his only contribution. "Benares" (190) and "Lochnagar" (194) are most to our liking out of the five sent by Mr. Robert W. Allan, R.S.W. Mr. Robert Little's Scottish landscapes are of the usual high order. "Lone Glenartney" (10) and the "Vale of Teith" (68) especially. Mr. S. J. Lamorna Birch is to the fore, as always, with his delightful Cornish scenes, among them pre-eminently with "The Valley of Penberth" (11). Of varied interest, but all good, probably Mr. W. Eyre Walker's "A Breezy Day over the Channel" (13) will most delight his admirers. His only contribution, but one of the best hung, is "Fiorella" (19), by Mr. F. Cadogan Cowper, A.R.A. Two excellent Surrey landscapes, "From Hurt Hill, near Haslemere" (15) and "From Hindhead, Surrey" (27), are by Mr. H. Hughes Stanton, who also sends "Near Boulogne" (140). Mr. J. C. Dollman's "Evening—South Downs" (26) divides the interest with his "Leopard Girl" (83). Mr. Allingham's "Old Middlesex House" (33) is a charming bit of quaint construction. "Searchlights" (51) is in strong topical contrast with his other three pictures, all of which are of more peaceful and customary character.

Mr. Russell W. Flint is to the fore with "Bathers" (57), and his two munition factory workers' subjects (123 and 135), more fortunate in their location than many. Mr. C. Napier Hemy's "Yacht Race" (120) is in his best vein, but "Time to go Home" (139) runs it close; and "The Red Buoy" (167) is a good third. Mr. W. Matthew Hale is perhaps best represented by "The Cattle of Pontivy—Brittany" (7), and by "Burano, near Venice" (85). Sir Ernest A. Waterlow, R.A., is strongest in "Breezy Weather" (12); of the other five, "On the Hills—Corfe Castle" (89) attracts us. Mr. Charles Sims, R.A., has only one picture, "Study for Ianthe" (91), which none can miss.

Of the rest, we can only mention "Gathering Sticks" (97), by Mrs. Laura Knight; "The Dean's Door, Westminster" (177), "The Rider on the Black Horse: Rev. vi." (103), a somewhat novel, but perhaps not far-fetched, conception of a many-times attempted realisation of the incident depicted; "The Mirror" (182), by G. Lawrence Bulleid, a not unattractive nude; and "Famine" (187), by Miss Mildred A. Butler.

Messrs. B. T. Batsford will shortly issue "English Church Woodwork," a study in craftsmanship during the Mediæval period, the text of which has been written by Mr. Frank E. Howard, the well-known archæologist of Oxford, while the illustrations are contributed by Mr. F. H. Crossley, of Chester.

Mr. H. J. Ramsbotham, town clerk of Lyme Regis, wrote to the Board of Agriculture for an interpretation of the expression "a holding of more than fifty acres" in connection with certain land which the council had contemplated taking under the Small Holdings and Allotments Act, 1908. In reply, the Board points out that the farm in question, if it consisted entirely of lands held under separate tenancies, each of which related to less than fifty acres, was exempt from compulsory acquisition under the Act.

THE EFFECT OF WAR CONDITIONS UPON THE PROPERTY MARKET (URBAN).*

By J. G. HEAD, F.S.I.

(*Continued from page 336.*)

The basis of all investment is security. The ideal security is one in which the capital is safe and easily realised; in which the income is steady, regular in its payment, and free from trouble in collection. In return for such absolute security the lowest rate of interest which the state of the money market permits is accepted by the investor, and just so far as any individual investment departs from the ideal security, so much higher is the rate of interest which the investment is expected to pay.

As a matter of fact, there is no investment whatever which exactly conforms to our definition of the ideal security, for even those which are designated "gilt-edged" are subject to fluctuations of capital value according to the greater or less value of money for the time being. Nevertheless, the gilt-edged is the nearest available approach to the ideal security, and, as such, it forms a datum with the rise and fall of which all other securities rise or fall more or less in proportion. For example, in the times when gilt-edged securities (Consols) were paying 2½ per cent., investors were willing to buy freehold ground rents to pay 3 per cent., leasehold ground rents at 4 per cent., and freehold rack-rents at 5 per cent., while leasehold rack-rents were expected to pay 6 per cent. to 8 per cent., according to circumstances.

If, therefore, we compare the fall in gilt-edged securities with that of the property market under circumstances which test both to the uttermost, we may look to obtain material from which to form a reliable opinion as to the stability or otherwise of landed investments, and to demonstrate to what extent they deserve the confidence of the investing public.

Let us, therefore, begin by comparing the movements of Consols with those of freehold ground rents, which may be described as the gilt-edged security of the property market, and which therefore afford the best comparison.

During the period January 1, 1914, to December 31, 1916, the highest and lowest prices of Consols were:—

1914	77 11/16	—	66⅞
1915	69⅞	—	57
1916	61¾	—	56

showing a variation of more than 27 per cent. During the same period the fall in the sale price of freehold ground rents averaged 20 per cent.—a comparison in favour of the property market, and one which is valuable as being made between two investments which have in common absolute stability of income and the maximum degree of security for capital in their respective spheres.

With regard to other property investments, such as shops and residences, greater hazard attends capital and income alike, so that under the shock of war we might expect to find a large depreciation of capital value; indeed, it would be no reflection upon their excellence were that the case. Yet in actual fact the price of good leaseholds has declined only about 25 per cent.

Look, now, at the second essential of a good security—stability of income. We find it is true that the rents of large residences have declined, and that in certain districts reductions have been made in the rents of large shops for the duration of the war; but medium-sized properties have held their own in the matter of rental, while the uplifting of the smaller properties was so marked that an Act of Parliament had to be passed to prevent the rents being raised; and it is no exaggeration to say that, but for the Act, they would have risen throughout the country, not through the cupidity of landlords, but by the natural increase in value through the increased demand.

Again, if we look at mortgages, it is true that they are more difficult to negotiate; diversion of capital makes that inevitable. The rates of interest have been raised; again inevitable, since the interest on gilt-edged securities has been raised. But it is significant that, while the interest on gilt-edged securities at one time rose from 3½ to 6 per cent.—an increase of 2½ per cent.—the highest rate demanded for mortgage interest is 6 per cent., showing a rise of 2 per cent. only over pre-war rate.

That the property market is sound and healthy is proved by the manner in which it has withstood the shock of the upheaval. Nevertheless, it cannot be denied that its volume has greatly shrunk owing to the influences to which we have referred. True, there has been during the last few months a satisfactory movement towards revival; but, depending as it does upon the amount of money available for investment, it is inevitable that until easier monetary conditions prevail the property market must suffer, and the amount of business done remain at a figure much below the normal. The natural sequence of events would be that, after trade, commerce and industrial undertakings generally have achieved prosperity; after money has been accumulated to an extent which will permit of the releasing of some considerable portion of that which is now locked up in Government securities; after money has been found for the industrial expansion which is looked for; after these events, and not till then, would the property market resume its buoyancy of operation, capital values reviving automatically as gilt-edged interest declines. But to reach this stage will require the lapse of considerable time, and meanwhile the important market with which we are dealing must remain depressed, with results detrimental to the nation as well as to the individual, unless some practical assistance is forthcoming to meet the difficulty, and to bridge over the interval of the transition period.

The need being thus proved, the duty now devolves upon us of showing that the property market is worthy of such assistance. In the first place, then, if we return for a moment to our definition of the ideal security—one in which the capital is secure and the income stable—we shall see that the phenomena disclosed by our inquiries are most important in estimating the status of the property market in comparison with other forms of investment. We have, first, a variation in capital values less than that of the typical gilt-edged security, notwithstanding the fact that the property market prices are those realised under what we may call a "forced sale"; and next we find the rental or income exhibiting a steadiness which is remarkable when it is remembered that the rental which a prospective tenant is willing to pay for premises he is taking is that element which is the most susceptible to the influence of surrounding conditions.

It is amply proved, therefore, that the property market is no mere theatre for speculative enterprise, but that it provides a means of investment of the highest order. Nay, when it is realised that it carries with it influences of political and economic importance, in that ownership tends towards stability of thought and action, and that (the purchase of a home being frequently the first investment of savings) it lays the foundation of thrifty habits, it is, I venture to assert, no exaggeration to say that the property market is entitled to be considered as the premier security of the nation. But beyond all this, excellent as it is, there rises the fact that, bound up with the well-being of the property market, is the problem of the "Housing of the People." Unless the property market is in good condition houses cannot be built, and the people must suffer for want of that prime necessity of life—a roof to shelter them. That this is no idle statement is shown by the actually existing state of things. The shortage of dwellings of the smaller type is most serious. From every quarter the cry is the same, "We need more workmen's dwellings," "None to be had," "A famine in small houses." These are fair specimens of the reports received, while the correspondent from one Midland town states that at least 14,000 are required in that district alone.

Let us look for a moment at the facts. According to Mr. A. W. Shelton, of the National Housing and Town Planning Coun-

* Read at the Ordinary General Meeting of the Surveyors' Institution held on Monday, April 16, 1917.

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cil, about 80 per cent. of all the dwelling-houses in the country come within the description of small dwellings, i.e., of the annual value of £20 downwards. To keep pace with the increase of population, the demands of sanitation, and the renewal of worn-out buildings at least 100,000 should be built every year. The number actually constructed has fallen far below this necessary minimum; in fact, the annual numbers have shown a sharp decline, until during the year 1916 the number of small houses built is stated to have shrunk to the miserable total of some 10,000. The shortage at the present time reaches the formidable total of 500,000, and the correspondent who speaks of there being a "famine" uses a term which is not a whit too strong.

Now it is further shown by statistics that of the total number of small houses built at least 97½ per cent. have been erected by private enterprise, the remaining insignificant fraction representing the entire output of national and municipal bodies and of public utility societies. Further, the difficulties and disadvantages of the provision of small houses by public bodies is so great that the conviction is forced upon us that it is still upon private enterprise that we must rely to secure an adequate provision for the necessary accommodation; but private moneys cannot be attracted to an unduly depressed market, and if the problem is to be satisfactorily solved steps must be taken to relieve the depression by increasing the influx of capital.

Enough has been said, therefore, to show that the assistance of the property market is an object worthy of special effort.

As to the means to be adopted to this end, two essentials stand out above all others:—

Money must be forthcoming in the shape of liberal loans at moderate rates of interest; the property market must be freed from the paralysing influence of menacing legislation.

The provision of cheap money would render private enterprise a reasonably profitable undertaking and tend to induce capitalists to undertake the erection of houses. It would also stimulate the business of the property market as a whole, and sustain it over the transition period until its normal functions are restored in the ordinary course of commerce.

The method by which this cheap money is to be obtained should be our next consideration.

Under normal conditions a considerable proportion of the purchases of house property are assisted by means of loans, and in the existing circumstances the proportion of dealings requiring such assistance must of necessity increase, since fewer purchasers will be in a position to pay for the property outright. The loan is secured upon a mortgage of the property, and is advanced by a building society, bank, or from private funds. In the two latter cases a margin of one-third is required, building societies being content with somewhat less, and the interest is fixed by the current price of money.

In the immediate future, during the transition period, if the market is to be effectively assisted, the proportion of loan to purchase moneys must be more liberal, and at the lowest possible rate of interest. Hitherto all advances on dealings in property have been made solely upon the value of the property, and even in commerce, where a tradesman asks for an advance to enable him to prosecute some scheme which to him seems advantageous the lender—usually a bank—requires the deposit of deeds of properties belonging to him or of stocks or shares.

The essential feature of the security thus demanded is that it should be readily negotiable or convertible into money. For the purpose of our present consideration this may be termed "absolute security." Private lenders probably could not be expected to entertain any other form of security, but the remaining sources of borrowed capital, such as building societies, banks, or even the State, might well pass beyond this limit; indeed, building societies already lend a far larger proportion than the conventional two-thirds, securing themselves by repayment on the instalment system, and improving their position with every payment. That this is a sound method is shown by the extent and success of building societies throughout the kingdom. As to the ordinary banks, the strict lines of British banking are defined by the *Bankers' Magazine* as refraining from making advances where the security is not fluid or easily realisable, but of a nature likely to tie up money for a lengthened period so as to interfere with the prompt payment of sums deposited with them. Nevertheless, bankers have been accustomed to relax these rules in favour of customers of known integrity and ability, and, in addition, to make loans in furtherance of commercial undertakings considerably beyond the value of the actual securities lodged with them.

It is now, however, realised that at the end of the war conditions will be such as to make it necessary that such extended loans shall be the rule, and not the exception. If they cannot be arranged through the medium of ordinary banks, an institution will be set up possessing ample powers adapted to that end. Such an institution is the proposed *trade bank*, which, being free from the restrictions of ordinary banking, will be in a position to foster commercial undertakings wherever advances of capital may be required. Such banks have long been known in France and other European countries, and have materially contributed to the commercial prosperity of the districts in which they exist. The feature of such institutions is that, after due inquiry into the merits of the scheme for which the advance is required, loans are arranged not only beyond the limits of any absolute security which may be available, but even in the entire absence thereof. It must not be concluded, however, that the loan is made without security. On the contrary, the security upon which the bank relies is fourfold—first, the merits of the particular scheme; next, a certain amount of control in the prosecution of the object; then the goodwill of the business and the financial standing of the borrower; and, lastly, his character and ability. These constitute what may be called "latent security," as distinguished from the "absolute security" above referred to.

Land banks also make advances to agriculturists upon similar lines, the essential point in every case being the existence of this "latent security."

If, then, we can show anything in the property market analogous to "latent security," or any alternative which will equally secure payment of interest and return of the borrowed capital, we shall have established the appropriateness of extending to the property market the facilities which commerce will derive from the operation of the trade bank. To make such assistance of general value, it will be necessary to let it be known that all legitimate purchasers of property may hope to derive therefrom more liberal financial assistance than has hitherto been obtainable from the ordinary sources, while the inquiry which would precede the granting of such assistance would secure the exclusion of undesirably speculative schemes.

It should be observed that the assistance required by the property market is not in the shape of loans without absolute security, but only somewhat beyond the orthodox two-thirds proportion, and I claim that this additional accommodation can be adequately secured.

In the first place, in the case of business premises purchased for occupation, the borrower can produce the same form of "latent security" which is present in commercial undertakings—namely, the goodwill of his business, and his character, ability, and financial standing. Private houses purchased for occupation offer a similar security, but without the business goodwill.

In the case of pure investment—and this class would include the all-important section concerned with house production—the "latent security" is absent in the form in which we have defined it. There is, however, an effective substitute available, the key to which is to be found in the methods of building societies, viz., the regular and systematic repayment of interest and capital.

The building society system is not of itself sufficient to meet the difficulty, for the reason that building societies are local and limited in their action, and that they do not possess the co-ordination necessary to provide a consistent relieving action throughout the land such as would be necessary for our purpose. Further, they hold other people's money, and must make a profit. They themselves borrow from banks, and are affected by varying rates of interest. What is wanted is a lending organisation operating throughout the land, and able to lend money at the lowest possible rate of interest consistent with the avoidance of loss. To do this would require a special organisation, and possible direct assistance from the State.

Under existing conditions, when a man borrows money to complete a purchase he takes the whole of the income, pays interest on the loan, and retains the rest as an annual profit on his investment. My suggestion is that this process should be reversed; that where the lending association advances a larger proportion than is customary it should receive the whole of the income, pay the borrowing owner interest on the capital left by him, and retain the balance towards the reduction of the loan. By this means the lending association would recoup itself gradually until the loan became small enough to be transferred to a private lender by way of an ordinary mortgage. For example, take a case of normal times.

Assume that a buyer purchased property for £3,000, bringing in a rental of £150 per annum, and borrowed £2,000 at 4 per cent. The statement of affairs would be as under:—

	£
Rental income	150
Interest on loan	80
Profit income retained by the borrower	£70

Now if the lending association were to advance 50 per cent. of the whole, or £2,400, and to receive the income, the statement would be as under:—

	£
Rental income	150
Interest paid to borrower on his capital, £600 at 4 per cent.	24
	126
Interest on loan of £2,400, at 4 per cent.	96
Profit rental, applicable as a sinking fund to reduce the loan	£30

This repayment would reduce the interest payable and leave a larger amount available every year for the reduction of the loan, with the result, in this particular instance, that in eleven years' time the loan would be automatically reduced to £2,000, or the usual two-thirds proportion, when it could be readily transferred to a private lender.

In the example shown normal rates of interest have been employed. Under existing circumstances the rates of interest, both of income and of loan, would be greater. This, however, would not invalidate the principle indicated; indeed, the proportion repayable would probably be higher under existing conditions than that shown in the example set out above

No allowance is made for expense of management as the example given is one where the property is let on repairing lease, and involves only the quarterly collection of the rent. Under other circumstances the profit rental would naturally be higher, leaving room for a charge for management.

The advantages of the method suggested are:—

It would meet the difficulty of money shortage; it would free the loan capital within a period much shorter than would be the case under the building society or instalment method; it would cultivate the highly important habit of thrift by making possible once more the purchase of a home; it would stimulate the building of houses by private enterprise, and, in so doing, it would go far towards solving the burning question of the people's housing, rescuing this most important of post war problems from the doubtful and dangerous solution which is held to lie in the provision of housing by the municipality or by the State; finally, by its automatic action in securing regular payment of interest and replacement of capital, it would qualify the transactions of the property market for participation in the assistance of the trade bank or other similar institution.

(*Continued on page 370.*)

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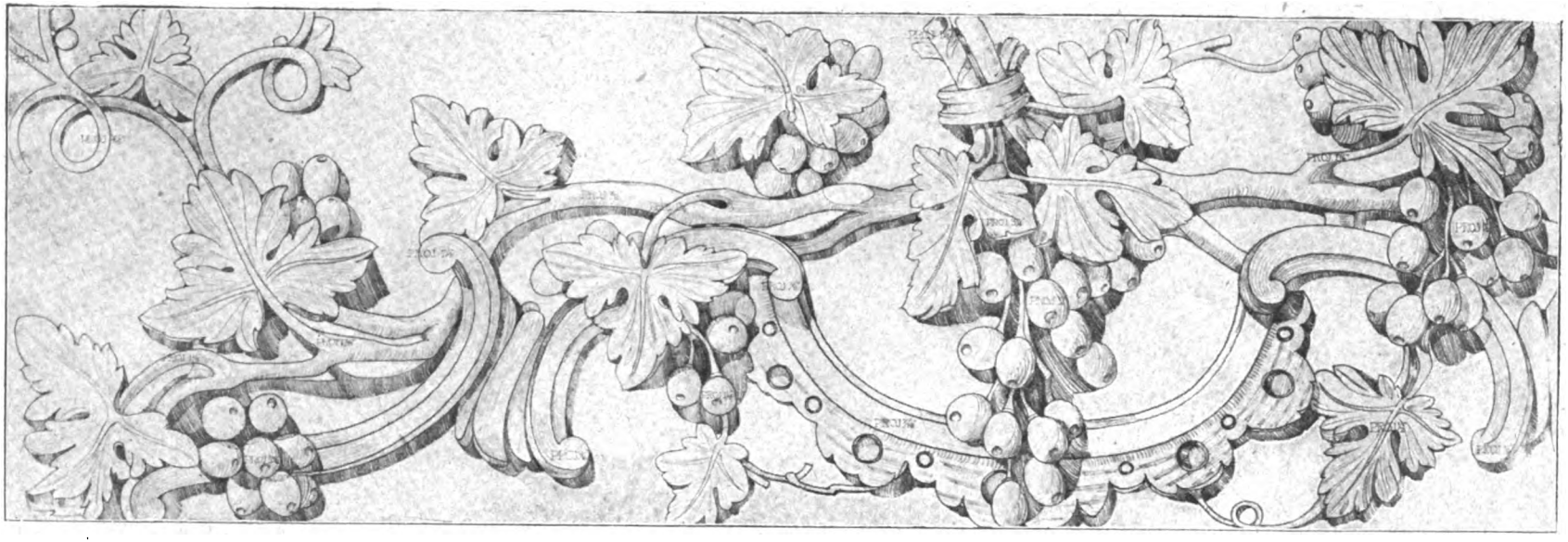

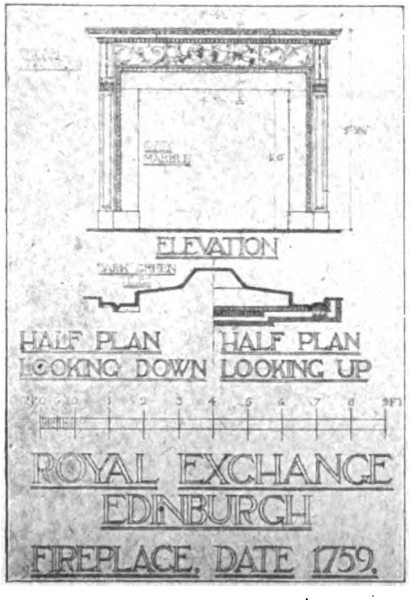

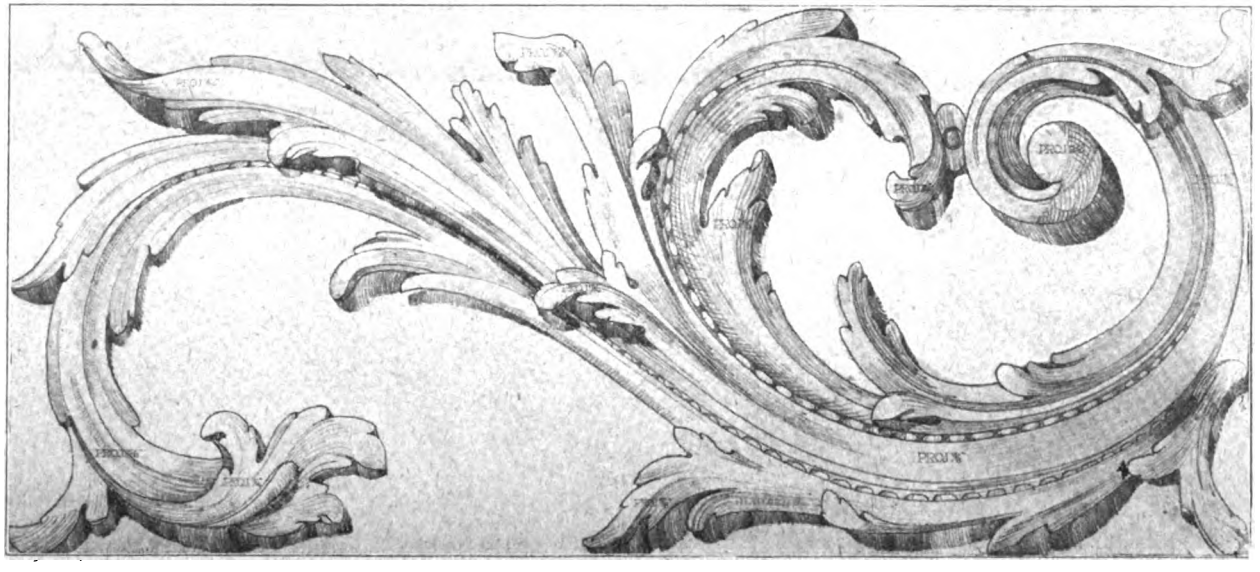

CHIMNEY PIECE, ROYAL EXCHANGE, EDINBURGH : DETAILS.—Measured and Drawn by Mr. STEWART SIM.

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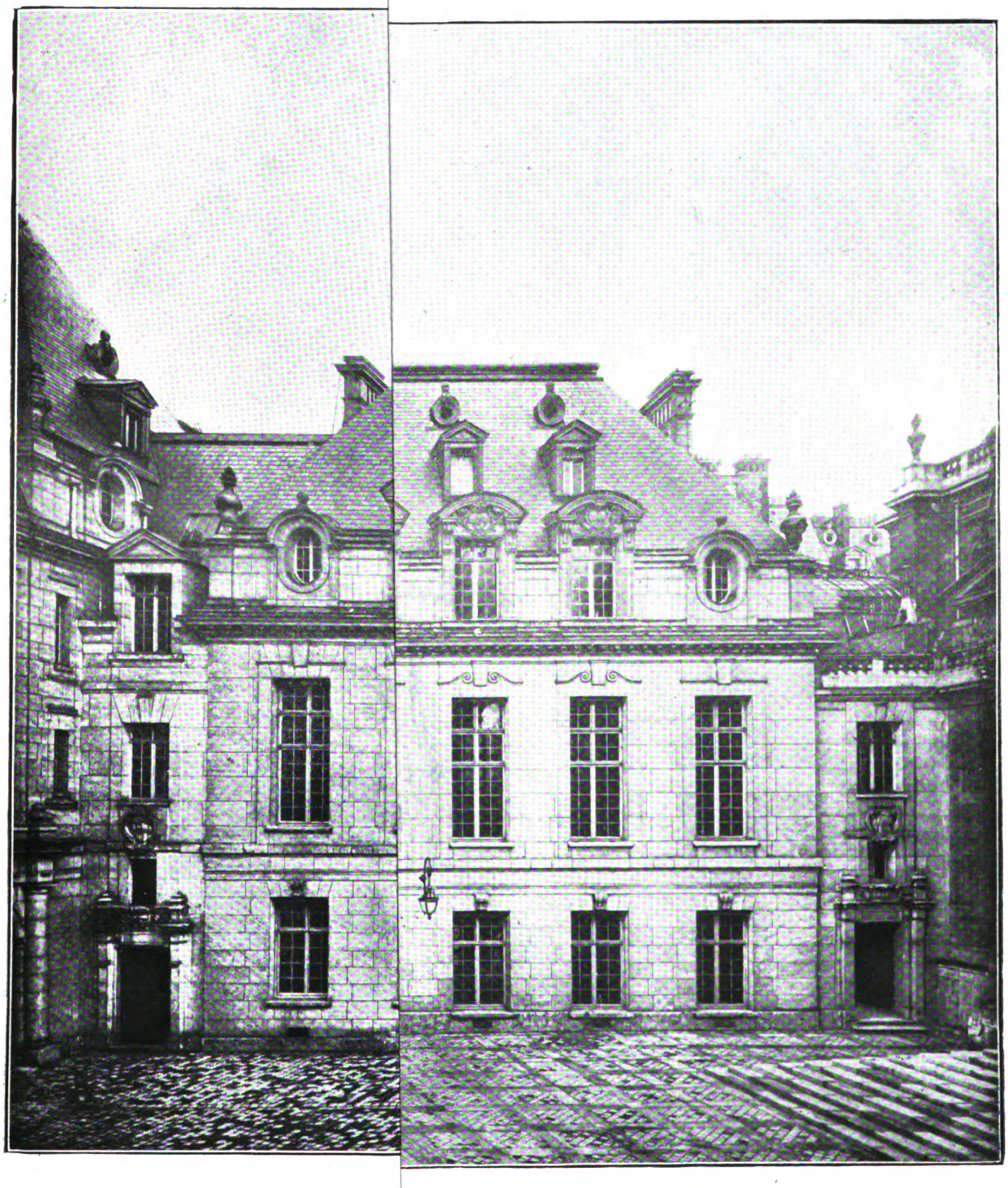

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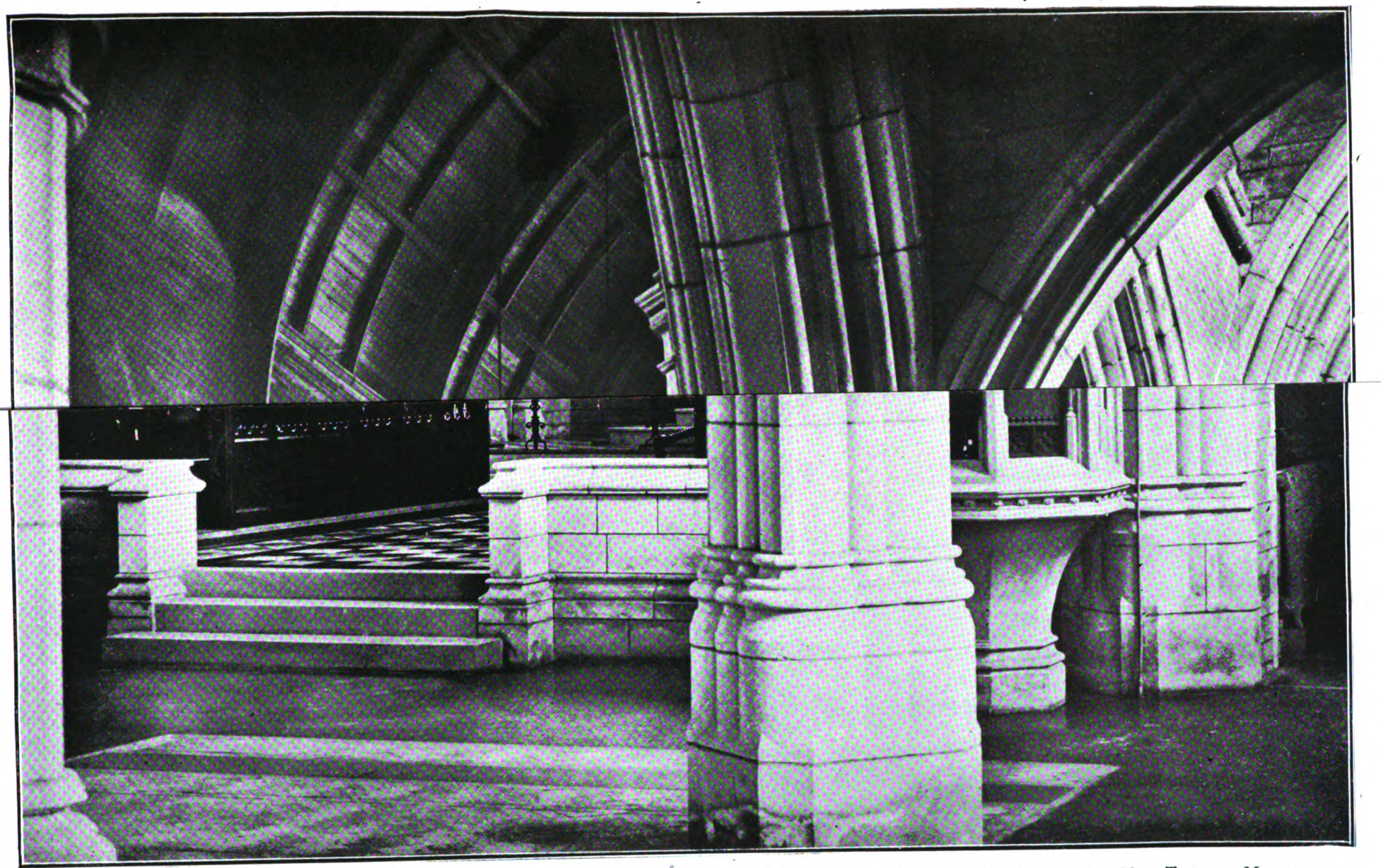

CHURCH OF ST. MARY AND ALL SAINTS, POTTERS BAR, MIDDLESEX.—From a Photograph by Mr. THOMAS MORELAND.
Mr. J. S. ALDER, F.R.I.B.A., Architect.

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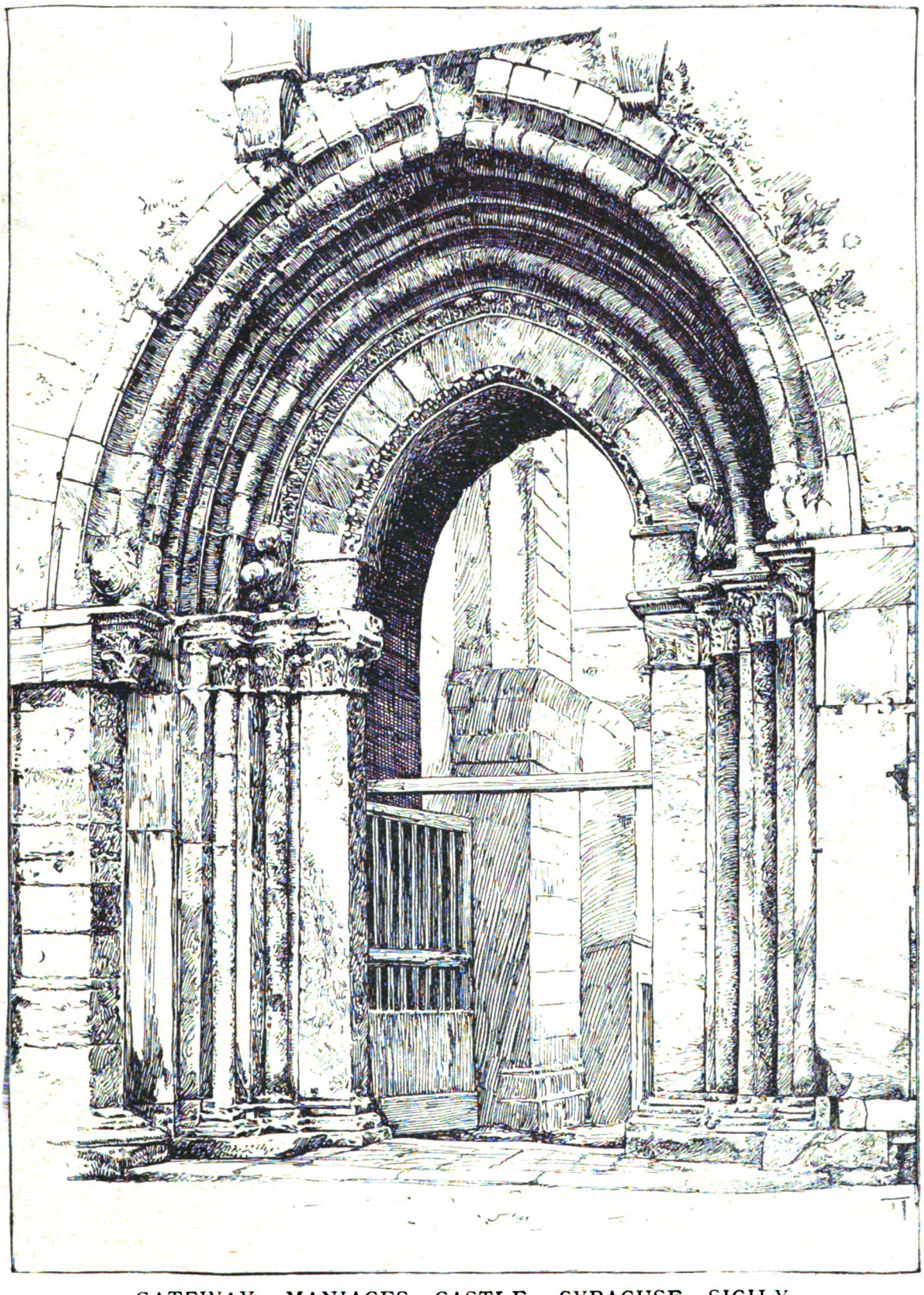

GATEWAY, MANIACES CASTLE, SYRACUSE, SICILY.
From a Pen and Ink Drawing by Mr. F. Hamilton Jackson, R.B.A.

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Our Illustrations.

CHURCH OF ST. MARY AND ALL SAINTS, POTTERS BAR, MIDDLESEX.

Potters Bar is an ecclesiastical parish cut off in 1833 from South Mymms, and a concrete temporary church in the Italian style was in due course erected, but for a long time, with the growth of the district, it had been obvious that a new church must be provided. This has now been accomplished, and the architect, Mr. J. S. Alder, F.R.I.B.A., of Arundel Street, Strand, has adopted an early type of fourteenth century architecture, carried out in lofty and wide proportions. The stone used came from Weddon and Stamford. The black and white marble of the chancel and sanctuary was brought over from Namur just before the outbreak of the war. A small wooden altar, about 300 years old, has been placed in the little chapel of All Saints, under the organ loft. Next to the church a parish hall has been built. The photograph reproduced is a very fine one by Mr. Richard Moreland, who is not a professional photographer.

THE NEW SORBONNE, PARIS, COUR D'HONNEUR, EAST ELEVATION.

The plans, principal elevation, and some interior views of this great university building, of which M. Hénri Paul Nénot, the R.I.B.A. Royal Gold Medallist, is the architect, will be found in our issue of March 7 last, with some account of the Sorbonne and some particulars of the life and works of this famous French architect, whose portrait appeared in the same issue. Other buildings chosen as typical of M. Nénot's style of work were given on March 21, viz., the Hotel Meurice Grand Hall and the Banque Dreyfus, Paris, and in the issue of April 4 we gave photographs of the Nationale Banque and the Hotel de la Cie. Genl. Transatlantique, Rue Auber, also in Paris. We now supplement our illustrations of the new Sorbonne by one of the east front of the Cour d'Honneur.

GATEWAY OF THE MANIACES CASTLE, SYRACUSE, SICILY.

This illustration shows the gateway which was put up in 1038 by the Byzantine General George Maniaces to commemorate the defeat of the Saracens, and is a fine early example of a richly ornamented pointed gateway. The brackets are those on which the antique bronze rams stood which bleated in a high wind, one of which still exists in the Museum at Palermo, a splendid piece of metal work. There were two of them here until the revolution of 1848, when one was destroyed. The Castle contains a large subterranean bath or cistern, known as the Bath of the Queen, and some of the original work remains, though the decorative sculpture has been removed. There are several of these subterranean baths or cisterns in Syracuse, to which one descends by forty or fifty steps, one of which, that beneath the Norman church of S. Nicolò, is said to be the only one in existence due to the Greeks. It is sustained by fourteen thick piers. In the Castle there are also remains of the church and the refectory. The former has a beautiful Arabo-Norman doorway of black and white marble, and the latter a fine chimney-piece and one column with a good capital. This drawing was shown at the Royal Academy Winter Exhibition of Graphic Art by Mr. Hamilton Jackson, who made the sketch for his admirable "Guide to Sicily," which was published by Messrs. Methuen and Co., and we are indebted to them for the permission to use this subject.

CHIMNEY PIECE, ROYAL EXCHANGE, EDINBURGH.

This sheet of measured pencil details so feelingly drawn is the work of Mr. Stewart Sim, of Edinburgh. It shows some exceedingly good carving in full relief. The fireplace really has an enriched superstructure or over-mantel painted with the city arms, but this mural part is omitted here because the work is of inferior quality, and, no doubt, of much later date, also quite out of character with this refined fire-place. The premises to which it belongs was formerly known as "John's Coffee House," and this older building has long been incorporated in the Royal Exchange, which building was finished in 1761. The following extract from Grant's "Old and New Edinburgh" is interesting as an account of the old order of things obtaining in the city in those days. "The first coffee house opened in Edinburgh was John Row's, in Robertson's Land, a tall tenement near the Parliament House. This was in 1663. It was shut up in 1677 in consequence of a brawl reported to the Privy Council by the town major, who had authority to see to such matters. The north-east corner of the Parliament Close was occupied by John's Coffee House. It was the resort of judges and lawyers of the eighteenth century for consultation and for their 'meridian' or twelve o'clock dram; for in those days every citizen had his peculiar 'howff' or place of resort by day or night, where merchants, traders, and men of every station met for consultation or good fellowship, and to hear items of news that came by the mail or stage from distant parts." The design of this chimney-piece is as a whole very much on the typical lines of the time, but the inconsequential combination of casual scroll work interspersed with the almost naturalesque rendering of the vine, shown by the middle panel, is quite uncommon in detail. The upper drawing on the illustration shows about three-fourths of this spirited piece of carving.

THE ARCHITECTS' BENEVOLENT SOCIETY.

The sixty-seventh annual general meeting of the Architects' Benevolent Society was held in the rooms of the Royal Institute of British Architects on Thursday, April 12, 1917. Mr. Ernest Newton, the President of the Society, occupied the chair, and was supported by numerous members, including Sir John J. Burnet, Henry Lovegrove, Major E. C. P. Monson, Geo. Scamell, W. Henry White, Arthur J. Style, C. H. Brodie, C. H. Lohr, W. Hilton Nash, Refinald St. A. Roumieu, Percivall Currey.

The Hon. Secretary (Mr. Percivall Currey) read the annual report, and the Chairman in moving its adoption, said tha, in connection with the general funds of the Society it was satisfactory to note that, notwithstanding the stress of present times, there was practically no falling off in subscriptions as compared with the previous year, while over £300 was received in donations. It has been the aim of the Council for many years to extend the list of subscribers. The result was, perhaps, scarcely a matter for congratulation—certainly they could do with more general support; but the sustained loyalty of the general body of subscribers was a matter for congratulation. If they had not been able to add many names to the list of subscribers, they had, at any rate, the satisfaction of knowing that very few names have been withdrawn. We all knew how severely architects had suffered in consequence of the war; we also knew that there were many architects whose practices had rarely been so protable. He should like to make a very special appeal to these latter gentlemen, either on behalf of this Society or on behalf of the Architects' War Committee whose funds it administers.

Sir John Burnet moved the election of Mr. Ernest Newton as President for the coming year, which was carried unanimously. Mr. Reginald St. A. Roumieu was elected Vice-President, and the Council as follows.—Messrs. Walter L. Spiers, Percy B. Tubbs, W. Henry White, Sir John J. Burnet, William Woodward, Arthur Ashbridge, A. Saxon Snell, Lewis Solomon, J. T. Crackett, Felix Clay, Edwin T. Hall, William Grellier, Henry Lovegrove, and Edwin J. Sadgrove (representatives of the Society of Architects.

A cordial vote of thanks to Mr. W. Hilton Nash, the retiring Hon. Treasurer, and his re-election for the ensuing year of office, was moved by Mr. Osborn C. Hills and seconded by Mr. Reginald St. A. Roumieu. Mr. Nash, in replying, regretted the Society were not more generally supported by members of the profession who were in a position to do so.

A similar vote of thanks was moved to Mr. Percivall Currey, the Hon. Secretary, by Mr. Henry Lovegrove, which was seconded by Major E. C. P. Monson. Mr. Currey, in replying, thanked the meeting for their kindness, and referred especially to the services of the Assistant Secretary.

Mr. Reginald St. A. Roumieu proposed a cordial vote of thanks to Mr. Ernest Newton for presiding. In replying, Mr. Newton said that it always gave him great pleasure to be present at the Council meetings, as the work of the Society was always carried out harmoniously, and the idea of being helpful to less fortunate brother architects was always kept in view.

The Report stated that the Council had continued to administer the funds entrusted to their charge by the Government Committee on the Prevention and Relief of Distress by means of the civic surveys, as well as those collected by the Architects' War Committee. In the former case the sum of £6,500 has been received from the National Relief Fund for the payment of salaries of the workers in the three areas of the surveys, viz., Greater London, South Lancashire, and South Yorkshire. The funds which have been administered on behalf of the Architects' War Committee, to which contributions have been received from time to time from the National Relief Fund, have been disbursed either in the payment of employment in connection with schemes promoted by the Professional Employment Committee or in special grants in cases in which this form of assistance was considered to be the more helpful. The sum of £2,071 9s. 10d. has been distributed in this way. The loan fund of the Architects' War Committee, although small, has also helped to relieve a few members of the profession from financial difficulties caused by the war.

The general work of the society has meanwhile proceeded as usual. The sum of £798 10s. has been paid in grants and £251 to pensioners, thus making a total of £1,049 10s.

The subscriptions received amount to £631 12s., as compared with £636 19s. received in the previous year, while £313 7s. has been received in donations. Among the principal donors may be mentioned Sir R. Rowand Anderson, £100; Mr. J. T. Cackett, £50. Mr. Archibald M. Dunn, £20 10s.; Mr. Arthur Ashbridge, £10 10s.; Mr. Benjamin Ingelow, £10 10s.; the Tylers and Bricklayers' Company, £10 10s.; Miss E. M. Charles, £10 10s.; Mr. A. N. Prentice, £10; Mr. A. E. Habershorn, £10; Sir Ernest George, £7 7s.; Mr. Walter L. Spiers, £5 5s.; Mr. Lewis Solomon, £5 5s.; Mr. Arthur B. Plummer, £5 5s.; Mr. Henry Beswick, £5; and various smaller amounts. Sir A. Brumwell Thomas has increased his annual subscription to £5 5s.

The donations received during the year, together with the balance carried over from the capital account, enabled the society to invest £800 in the War Loan.

The increase in the expenses of the society is due to the extra cost of printing and legal charges incurred in connection with the late Mr. G. Bertram Bulmer's will, by which the society is residuary legatee for £2,400.

The Uxbridge R.D.C. have passed plans, submitted by Bell's United Asbestos Co., for three flights of stairs, a large canteen, and two blocks of cubicles.

Mr. A. F. Whinney, senior partner of Messrs. Whinney, Smith, and Whinney, of London, has been appointed Adviser upon Costs of Production to the Admiralty, and he will be in direct charge of a costing department attached to the Department of the Director of Navy Contracts.

The death occurred at Brighton last Friday of Sir John Howard in his eighty-seventh year. His long and distinguished career as a constructor of waterworks and railways is familiar to all. He was a director of the North British Railway Company and also of the South-Western Suburban Water Company. Sir John completed the building of the Brighton Palace Pier at his own expense.

Second Lieutenant William Scott Crawford, London Regiment, who was killed in action on Monday week, was the youngest son of Mrs. Crawford, of Holmedene Avenue, Herne Hill, S.E., and was twenty-nine years of age. A practical engineer and journalist, he joined the financial staff of *The Times* on January 1, 1914. He received his commission in January of this year, and had been eight weeks only at the front before he was killed.

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THE EFFECT OF WAR CONDITIONS UPON THE PROPERTY MARKET (URBAN).

(*Continued from page 356.*)

But there is another thing which is quite as important to the welfare of the property market as is the proposed financial assistance, and that is the freeing of it from the fetters of hampering and paralysing legislation. I allude to the malign influence of the Finance Act, 1909-10. This enactment set out to impose taxation on various interests in land. It imposed three forms of tax—increment duty, by which it was intended to secure for the community a proportion of increment in value on the assumption that such increment was due principally to the action of the community; undeveloped land duty, which was aimed at those who withheld from development land which might be developed with profit to the community; and reversion duty, which provided that when, at the termination of a lease, the property came into the hands of the freeholder, he should pay a substantial proportion of the increased value to the Government. This tax, as applied by the Inland Revenue Department, is apparently based on what many of us regard as an unfounded assumption that the freeholder then comes into something in the nature of a bonus, or of some increment for which no consideration has been given by him.

It is not proposed, however, to discuss the appropriateness or otherwise of this taxation, but rather to point out its effect on the property market Of course, any taxation must reduce the capital value of the object taxed, but so long as the incidence of the tax is clearly defined, and its extent is capable of being estimated with accuracy, the loss in value can be readily calculated at so many years' purchase of the tax, and after the first loss has been digested, the operations of the market should not suffer in consequence thereof. But in the case of the Finance Act, 1909-10, there are features present the effect of which goes much farther than the actual loss due to the taxation itself. In the first place the language of the Act is so ambiguous and confused that the bare meaning thereof has taxed the analytical powers of our most eminent judges. Then the circumstances under which it was passed, and the speeches of many of its adherents, supported the view that it was only the beginning of a campaign against land, and that it constituted a menace against that subtle but all important quality in an investment—its credit. By lessening the confidence of investors in its safety the Act has injured the property market as nothing else could have done. It is the apprehension of trouble (undefined and difficult to estimate) which is chiefly responsible for the pre-war reduction in the capital value of land and houses, and it is an aggravation of the charge that this condition of things has been brought about without any corresponding advantage to the State. Ordinarily, the depreciation consequent on the imposition of a tax is counterbalanced by the benefit derived by the country from the taxes collected, just in proportion as the amount of the tax received exceeds the cost of collection. As, however, in this case the amount collected falls far short of the cost of collection, the Act derives no justification under this heading.

The combination of the uncertainty above referred to, and of the imposition of the actual tax, has, in addition to the above-named general effect, had the specific result of paralysing private enterprise in the production of houses for the accommodation of the working classes. The enormous proportion which this class of house bears to the general total of dwelling-houses, and the unparalleled shortage of such accommodation shows how serious has been the effect of this enactment, and justifies the statement that the Act has in this respect been injurious to the country, while it has entirely missed its mark as a means of revenue production.

It has been suggested that amendment of the acknowledged defects of the Act would meet the case; but in view of the pressing emergency of war conditions, when it is essential that nothing should be done to hinder, but that everything possible should be done to foster the credit of the country, it is urged that repeal is the proper course. Nothing short of that would remove the feeling of insecurity, which is the chief element of the evil which has been wrought, and there, upon national as well as economic grounds, Part I. of the Finance Act of 1909-10 should be repealed, not as an undue favour to holders of landed property, but as a measure of necessity directed towards the conservation of the national resources.

It is obvious that in good husbandry the ground must be cleared before the crop can be cultivated, and, therefore, in summarising the conclusions of this paper, the suggestions are placed in the following order:—

First, let the dead hand of harmful legislation be removed, and next, let provision be made for liberal financial assistance to all sections of the property market. I venture to predict that if such assistance be forthcoming there need be no long transition period of depression, but that this enormous market may, with a little help of a most reasonable and legitimate nature, be speedily restored to the prosperous condition which its excellence merits.

No excuse is necessary for the stress which is laid upon the importance of the problem of the property market, for that is self-evident, and I trust that not only has its urgency been demonstrated, but also that it is capable of solution and worthy of the best efforts which the nation's advisers can bring to bear upon the subject.

The inquiry which elicited the facts upon which this paper is based has brought to light many other points worthy of attention, which, although not directly related to the property market, have yet a bearing thereon, in that they affect the general well-being of the people, and so reflect upon that department of natural industry which provides them with their dwelling-places and business houses.

As an example, the impossibility of foreign travel has filled many of the holiday and health resorts in our own land, bringing something like a revelation to many who had apparently been under the impression that to enjoy beauty of scenery and healthful recreation it was necessary to go abroad. The same cause filled the British spas and watering-places. British and foreign visitors alike discovered that both the waters and the treatment were of the highest merit, and that the "cure" could be found there as readily as at any Continental "kurhaus." The fetish of the German spa being thus broken, the future prosperity of our native spas remains in the hands of those who are responsible for their conduct, and who have it within their power, by wise management, to secure a constant stream of visitors drawn alike from our home population and from abroad.

The quick and effective response evoked by the stern call of necessity in the production of many materials which we had loosely allowed to slip from our grasp into that of the foreigner—the revelation of the immense and almost unsuspected power of manufacturing any given article—and the production of commodities which had never previously been made in any quantity in this country, should secure to our people new and important fields of commerce, if wise precautions are taken to avoid the sterilising of these founts of industry.

We have learned the unwisdom of leaving home production to the ungoverned principle of supply and demand and of regarding purchase in the cheapest market as the essence of a nation's economic welfare. This course of action in the past has placed Britain in a position of serious disadvantage in this time of war. Let us in future produce under the pressure of patriotism those things which we have produced under the pressure of war conditions, and make it certain that never again shall Britain be found in her extremity dependent upon a foreign and possible hostile Power for things essential not only to her welfare, but to her very existence. The lessons of adversity are priceless, and if under the stress of common danger, in which capital and labour have joined hands in the trenches, there should grow up a better understanding born of mutual knowledge; if in the arrangement of our national affairs political economy should be associated with patriotic economy; if the life of the nation should be lifted to the plane of the ideals for which it is striving, then the benefits which are gathered from the smoking ashes of the battlefield would outweigh even the heavy price which has been exacted by this war of the worlds.

PROFESSIONAL AND TRADE SOCIETIES.

THE LIVERPOOL ARCHITECTURAL SOCIETY.—The annual general meeting will be held on Monday, April 30, 1917, at 2 o'clock p.m., at the Society's Rooms, 13, Harrington Street, Liverpool, to receive and consider the Annual Report and to elect Officers and Council for the ensuing year. In view of the war conditions the council has not nominated any additional members for election on the council. They recommend the re-election of the existing council and officers. The present membership of the Society consists of 59 Fellows and 41 Associates, a total of 100. There are also 3 Hon. Fellows, 9 Hon. Associates, and 5 Students. Since the last Annual Meeting the council has held ten meetings, the avereage attendance being eight. The Exhibition, which was held at Liberty Buildings in October last, was enlarged by the addition of exhibits by the members of the Society, the School of Architecture and by various craftsmen. Further communications have passed with the R.I.B.A. respecting the suggestion that the Society through its Town Planning Committee should attend enquiries and actively take up the matter of town planning schemes with the local authorities concerned. The Council holds a somewhat different view and does not approve of strictly professional services involving a large amount of time and thought being voluntarily offered on public work. The Council again urged the Institute to impress upon the Local Government Board, that an architect should be professionally employed on the early stages of all town planning schemes ,more especially those submitted by the smaller Urban authorities. A report of the work of the Architects' War Committee of the Royal Institute of British Architects gave rise to severe criticisms, and strong expressions of opinion from this and other provincial Societies were laid before the Council of the Institute. It was felt that the policy of the Institute had resulted in a complete absence of any appreciation by the Government Authorities of the services which Architects by their special training were qualified to offer to the State. On the 21st February last a specially representative deputation consisting of members of the R.I.B.A. and of the Allied Societies waited upon Mr. Neville Chamberlain, Director of National Service, with a view of offering the services of the profession in connection with his scheme of Civilian National Service. The presdent attended the deputation on behalf of the Society. An Advisory Council has since been formed, consisting of members of the Institute and of the provincial societies to give what assistance it can in forwardng the work of Civilian National Service. The president has been elected a member of the Architects' War Committee, the Advisory Council and the Architects' Professional Employment Committee. he Income and Expenditure account and the Balance sheet show satisfactory surpluses.

NORTHERN ARCHITECTURAL ASSOCIATION.—The report of the council for the fifty-eighth session states that the membership is now 192, against 176 at the end of 1915. No elections have taken place during the session, and the decline in membership is due to the fact that four members, four associates, and two students have died, two members have resigned, and two members and two associates have been removed from the roll of members through the operation of Rule 19. The council regret to record the deaths of Mr. J. W. Dyson, who died on October 24, 1916; Mr. Edward Cratney, who died on December 1, 1916; Mr. Archibald M. Dunn, who died on

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January 17, 1917; Mr. H. G. Badenoch, who died on February 15, 1917; Mr. C. W. Bell, who died on November 30, 1916; Mr. H. D. Hodgkinson, who died on January 5, 1916; and Mr. T. Scott, who died on March 6, 1917. The council also regret to record that the following members have been killed on active service during the past session:—Capt. J. B. Cubey, killed on July 1, 1916; Capt. P. G. Graham, killed on July 1, 1916; and Mr. Irving Henderson, killed on July 1, 1916. The council have offered their congratulations to Major J. W. Douglas, R.E. member, on his receiving the Distinguished Service Order and the Serbian Order of the White Eagle, to Staff Capt. D. Hill on his promotion to the rank of Brigade Major, and to Capt. R. Mauchlen and Lieut. W. N. J. Moscrop on their receiving the Military Cross. The council have expressed their sympathy with Messrs. F. N. Weightman, S. Wilson, W. J. Smith and A. W. Wilkinson, who have been wounded—sixty-eight members on Service, five of whom have been killed. Owing to the war and the absence of so many members, no outdoor meetings were held, and the usual lectures at winter meetings were abandoned. Acting on the recommendations of the Finance Committee, the council has purchased £500 worth of 5 per cent. War Loan stock, with Glover bequest money, £350 worth of which was from capital previously on deposit at the bank, and £150 worth from income derived from investments. The council are offering no prizes to students during the ensuing session. The Students' Sketching Club and Classes Club are in abeyance at the present time.

LEGAL INTELLIGENCE.

LUXURIOUS DECORATIONS IN WAR TIME.—Before the Chertsey Bench on Monday the Director of Public Prosecutions summoned Messrs. Harrison, builders, Englefield Green, Surrey, and Howell J. Williams, Ltd., builders, Bermondsey, London, for carrying on building and constructional work at Bishopsgate House, Englefield Green, without having a licence from the Ministry of Munitions, contrary to Regulation 18 of the Defence of the Realm Act. Gerard Jurgens, King's House, King Street, London, Dutch margarine merchant, owner of Bishopsgate House, was summoned for aiding and abetting. Mr. H. T. Roome, for the Ministry of Munitions, said that an inspector who was sent down on January 8 last found that work of a costly description was being carried on at the house, which Mr. Jurgens had purchased for £17,500. It was being decorated in luxurious style when labour was urgently required for the erection of munition works. The value of the work done was estimated by an inspector of the Ministry at £1,400. Mr. Crawford, for Messrs. Harrison and Mr. Jurgens, said the former thought the regulations applied to constructional works only, and Mr. Jurgens had no knowledge that such a large amount of work was being done. Mr. Cecil Whiteley, for Messrs. Williams, said they had refused private work valued at hundreds of thousands of pounds, and simply carried out a little finer work at Mr. Jurgens's request to the extent of £350. Jurgens was fined £50, Messrs. Harrison £30, and Messrs. Williams £20.

Building Intelligence.

WINDERMERE.—At the Easter vestry meeting of the parish church it was stated that Sir William Forwood had offered to build and furnish a war memorial chapel and a clergy vestry at a cost of £2,500. Two memorial windows of stained glass, to cost £100 each, have been promised for this chapel by parishioners. The sum of £960 has been promised towards the cost of a new organ to be erected in the present clergy vestry, and £100 for a carved oak case for the organ. The chapel will be furnished with a holy table, reredos, prayer desk and lectern, and be seated with oak seats. The plans are in the hands of the chancellor of the diocese.

The "Wilson Premium" for the best paper read before the Crystal Palace Engineering Society during the past session has been awarded to Mr. E. G. Wilson for a paper on "Practical Roadwork in the United Kingdom."

OBITUARY.

We regret to record the death of the late Mr. John Little, the late hon. secretary of the Royal Victorian Institute of Architects. He was the son of Thomas Little, builder, of Manchester, England, was born in 1856 in Manchester, and educated at the Grammar School in that city. He arrived in Melbourne September, 1882, and entered the office of Grainger and D'Ebro. He later commenced practice alone, and afterwards took into partnership Hillson Beasley, now practising in Perth, W.A. At a later date his firm became Grainger, Kennedy and Little, and after a further period—in which he again practised alone—Grainger and Little, and at the time of his death the style of his firm was Grainger, Little and Barlow. For some years, while continuing his private practice, he was instructor in architecture at the Working Men's College. He became an Associate of the Institute in 1892, Fellow in 1900, honorary assistant secretary in 1896, and honorary secretary in 1900. During his twenty years' institute work, he only missed three meetings, except in the period of his absence abroad, and five meetings from which illness prevented his attendance. In partnership, he was associated with a number of important city buildings designed by his firm, including the Melbourne Savings Bank, Elizabeth Street; the last Town Hall additions, Swanston Street; Elizabeth House, Elizabeth Street; the Swinburne Technical College (in conjunction with Campbell and Kernot); Cliveden Mansions alterations, and a large number of residences and other buildings. His loss will be severely felt both in his work as honorary secretary and also as editor of the *R.V.I.A. Journal*.

Lieut. Walter Anderson Porkess, of the Royal Flying Corps, who was killed in action whilst flying on February 10, was the youngest son of Mr. U. Porkess, builder, of Grimsby. He was on the staff of Messrs. Heal and Son, London, when he enlisted soon after the outbreak of war. After six months in the Royal Bucks Hussars he was transferred to the Inns of Court O.T.C., and later obtained a commission in the Sherwood Rangers Yeomanry, from which regiment he was attached to the Royal Flying Corps. A letter from Lieut. Walter James says:—"Your son was quite one of the keenest and most efficient pilots we had in the squadron. He had done a great deal of flying during the last three weeks and was always most reliable and sound in his work. Yesterday afternoon he was doing some special observation work with his observer, Lieut. Roberts, when by a singular piece of ill-fortune his machine received a direct hit from an anti-aircraft shell, which is a very rare occurrence. They fell from a height of 8,000 feet, but it is very probable that they were both killed instantly by the explosion. As I have said, we all miss him very much, both on account of his work and also his good companionship."

We regret to learn of the death of Captain Leonard Neville Rogers, F.S.I., F.A.I., who was killed in France on April 11 at the age of 38. He was the fourth son of Mrs. Rogers and the late Mr. W. Bennett Rogers, J.P., of Danehurst, Westgate-on-Sea. He became a partner in the firm of Messrs. Rogers, Chapman and Thomas on January 1, 1906, and joined the Officers' Training Corps shortly after the outbreak of war, and obtained a commission with the 18th Northumberland Fusiliers, to which regiment his younger brother, Captain Vivian Rogers (also a partner in the firm), was already attached. He made himself worthy in every way to uphold the glorious traditions of the "Fighting Fifth," and his colonel writes:—"I am so sorry to hear of Leonard's death. It is a great blow to me. He was quite one of the best of my company commanders, so reliable, so safe. He took over D Company, which needed pulling together, and he soon had it in tip-top order. He will be hard to replace." The Major wrote to his Colonel (who is temporarily invalided in England): "He was killed by shell fire as he was returning to billets after nearly 40 hours' work."

Our Office Table.

A special meeting of the Electric Supply Committee of the Birmingham City Council was held last week, under the presidency of Alderman Jephcott, to consider a report of Mr. C. P. Sparkes (president of the Institution of Electrical Engineers) on the suitability or otherwise of the Nechells site for a permanent generating station. In his report Mr. Sparkes dealt exhaustively with the site in relation to coal, water, configuration, and other matters. He advised the committee that it was suitable for the purposes mentioned, and expressed a favourable opinion of the design of the engineer (Mr. R. A. Chattock), having regard to the time when it was drawn up and the progress of electrical science. All things considered, he approved of the design, and recommended that it should be carried out. The committee, after a long discussion, accepted the report, and decided to proceed with the erection of the permanent station as soon as practicable.

The Royal Institute of Public Health has arranged a second course of lectures and discussions on "Public Health Problems Under War and After War Conditions," at the Lecture Hall of the Royal Institute of Public Health, 37, Russell Square, London, W.C.1, on Wednesdays in April, May, June, and July, at 4 p.m. The course is intended primarily for Fellows and members of the Royal Institute of Public Health, medical officers of health, medical practitioners, sanitarians and others engaged in public health work and National Services are cordially invited to attend.

Mr. Prothero, the President of the Board of Agriculture, was in the chair last Friday at a meeting of Marlburians and friends of Marlborough College, at the Surveyors' Institute, Westminster, to consider the form of a memorial to Old Boys who have fallen in the war. Mr. Prothero moved that a fund should be raised to provide a permanent and visible record at Marlborough of the fallen, to educate there the sons of Marlburians who had fallen or been incapacitated, and, after the attainment of these objects, to establish an endowment fund or promote such other purposes for the benefit of the school as the committee of the Marlburian Club might recommend. He hoped the visible memorial would not take a utilitarian form, but a form which would appeal to the imagination. He was therefore strongly inclined to favour the suggestion that the memorial should consist of a cloister to the chapel. Mr. J. R. Taylor, in seconding the motion, said that the space where memorials and tablets could be put up in the chapel was practically exhausted. The erection of a cloister would cost at most £5,000; so that if that form of memorial were adopted there would be no danger of the education scheme falling through. The motion was agreed to unanimously.

A curious dispute arose at the Norwich Consistory Court on Saturday week concerning a memorial tablet erected in Burston Church to a fallen soldier by his uncle. The parents objected strongly to the tablet remaining in the church on the ground that they had not been consulted on the matter; that they regarded the action, however well-intentioned, as an invasion of their rights; and that they purposed placing a suitable memorial tablet to their soldier son in Shimpling Church, where, as the mother said, "My people all lie." Incidentally it transpired that a good deal of the friction was due to the Burston school strike. The soldier's uncle is a supporter of the rector's party, while his parents range themselves on the side of the strikers. Mr. Chancellor F. K. North presided over the Court. Mr. W. J. Joseph appeared on behalf of the uncle, a Mr. Ford, who is a farmer, of Burston. The parents of the soldier are Mr. and Mrs. Garnham, of Burston. After evidence had been given on both sides, the Chancellor intimated that he would deliver his judgment at the next Court.

In reference to the appeal recently issued through the Press to architects who sign the National Service form N.S.V. 1, the Architects'

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War Committee understands that the forms filled in by professional men who make their status clear under the heading "(e) Occupation" upon the form, are referred to a special branch of the Service, with its headquarters in London and branches in the provinces. In the case of such professional volunteers, unless they specially state under heading "(k)" that they are willing to do other than professional work, they will not be liable to take up manual labour or other service of a non-professional character. Should any demand of such a nature be made in error, the volunteer is at liberty to require that his form be referred to the nearest Professional Classes Branch office, where the mistake would be rectified.

The Maidstone Association of Building and Allied Trades has agreed with the operatives in Maidstone for an increase in wages of 1d. per hour all round from March 31, 1917. Rules as to work, as settled in 1913, have also been revised.

At Coventry, last week, Arthur Jayes, formerly a master plasterer at Wellingborough, was charged with burglariously entering a dwelling-house at Hamilton Road, Coventry, and stealing twenty £1 Treasury notes, clothes, and a number of other articles, including a £60 war certificate. Prisoner was sent for trial at Warwickshire Quarter Sessions.

At the Birmingham County Court, last Friday, before Judge Ruegg, K.C., an application for discharge in bankruptcy was made by Edward Woodward, builder and contractor, of Woodlands, Rubery. The Judge said it seemed to be a case where bankrupt had been unfortunate, negligent rather, but still unfortunate, and he granted the application, subject to the discharge being suspended for two years.

Messrs. J. Holbrook and Co., builders, 39, Foster Lane, sued Messrs. Crosse and Son, solicitors, 7, Lancaster Place, in the Lord Mayor's Court, on April 19, for £27 5s., for work done. The plaintiffs' case was that the prices were fair and reasonable. The defendants urged that the amount was excessive. A counter-claim was raised for old material taken away. The jury found for the plaintiffs.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

RECD.—Rev. J. B. W.—W. A. E.—J. L. H.—S. W. F. and Co., Ltd.—S. and S.—G. A.—R. and R.—B. B. and Co.—J. C. and Son—L. B. and Sons, Ltd.—B. R. C., Ltd.—W. H. S. and Son—A. C. T.

R. S. O.—Yes.

T. B. and Son.—Thanks, No.

TACTICUS.—Of no general interest just now.

L. D.—We know nothing of the people named. For the leading firms in that line see our "Directory" pages.

The interior of Brixton parish church is to be rebuilt at a cost of £2,000.

The death is announced of Mr. Thomas Brebner, architect and builder, Fraserburgh.

Mr. Fred Clayton, of Luddendenfoot, has been appointed surveyor to the Burley-in-Wharfedale Urban District Council.

Mr. Tom Butterfield, timber merchant, of Naree Street, Highfield Lane, Keighley, has passed away. He was about sixty-five years of age, and was well known in the town and trade.

A stained glass window is being placed over the altar in the Lady Chapel at St. Mellitus Church, Hanwell, in memory of Owen Harwood, a thirteen-year-old Boy Scout, who lost his life in trying to save two persons from drowning in the River Brent at Greenford last August.

LIST OF TENDERS OPEN.

BUILDINGS.

May 5.—Repairing the front of the Methodist Church, Darling Street, Enniskillen.—Rev. Alex. Harris, The Manse, Brooke Street, Enniskillen.

No date.—Rebuilding Parkeston Villas (three houses), Cliff Road, Dovercourt; making-up Seafield Road, Dovercourt; and various works in connection with houses in Fronks Road and Seafield Road, Dovercourt.—H. Steward Watling, F.S.A., Architect and Surveyor, Dovercourt.

ENGINEERING.

April 30.—Installation of a Vacuum Steam-heating System, and Supply and Erection of Powerhouse Buildings and Chimney.—For the Canterbury University College, Christchurch, N.Z.—The Registrar of Canterbury College, Christchurch, N.Z.

May 7.—Supply of Four Van Chassis.—For the Metropolitan Asylums Board.—D. Mann, Clerk.

May 11.—Supply, delivery and erection at their Stuart Street generating station of Coal-conveying Plant.—For the Electricity Committee.—Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester.

June 1.—Storm-water Pumping Plant, Calcutta.—For the Corporation.—The *Indian and Eastern Engineer*, 50, Fenchurch Street, E.C.

SANITARY.

May 1.—Scavenging of the Parish of St. Margaret's-at-Cliffe.—J. J. Bettridge, Clerk to the Parish Council.

May 9.—Supplementary works of sewage disposal to be carried out at existing outfall works at Limpsfield and Oxted.—For the Godstone Rural District Council.—E. A. Head, Clerk to the Rural District Council, East Grinstead.

ROADS AND STREETS.

April 30.—Materials and works for re-surfacing a roadway with asphalte macadam.—For the Battersea Borough Council.—W. M. Wilkins, Town Clerk, Town Hall, Battersea.

May 1.—Supply of 2½ in. Tarred Macadam.—For the Hipperholme Urban District Council.—G. W. Thompson, Engineer and Surveyor, Council Offices, Hipperholme.

TIMBER.

April 29.—Delivery to the Workhouse, Prince's Road, Kennington, S.E., of a quantity of timber suitable for chopping into firewood.—For the Lambeth Board of Guardians.—J. L. Goldspink, Clerk to the Guardians, 128, Brook Street, Kennington Road, S.E.

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OUR ILLUSTRATIONS.

Church of St. Germain l'Auxerrois and the Pont Neufs, Paris. Royal Academy Winter Exhibition of Graphic Art. From etchings by Mr. R. Ray-Jones, A.R.E.

Stowell Park, near Cirencester, Gloucestershire. The new south terrace for the Earl of Eldon. Mr. Sydney Tatchell, F.R.I.B.A., Architect. Two views.

Stockport Grammar School. Details of the Main Front and Cloister entrance tower to the western facade. Messrs. R. H. Spalding and E. G. Theakston, F F.R.I.B.A., Architects.

Currente Calamo.

The two words "Extraordinary Traffic" as used in the Highways and Locomotives Act, 1878, have been worth their heavy weight in gold to the lawyers. Every Court has had a turn at their meaning, and a long list of authorities on their construction is still growing longer. But the recent case of "Abingdon Rural District Council v. City of Oxford Electric Tramways (Ltd.)" is one of general interest to ratepayers and house-owners, as it will affect many other similar localities nowadays. It all begins with the motor-bus, which, by means of its weight, speed, and modes of running and stopping, is the champion in the tearing up of ordinary road surfaces, even worse than contractors' lorries. The defendant company had, in 1914, put on a good service of motor-buses, which, when loaded, weighed from 4½ to 5½ tons each. The roads through which these ran had been the nice quiet places to which we were once accustomed. With twenty-four of these motors running over them every day they soon got damaged. The Council had to do excessive heavy repairs, and now claimed £498 from the company for expenses incurred by them as the result of their "extraordinary traffic." Mr. Justice Sankey had held that the mere demands of the district for these buses could not change this extraordinary into ordinary traffic, though it might be necessary, and could in time become ordinary, so he gave the Council judgment for £350. On defendants appealing this was confirmed by the Lords Justices mainly on the ground that these motor-buses were quite different from the horse vehicles. It was thus not only an additional traffic but it was also of a new kind; and so was "extraordinary," especially having regard to the nature of the neighbourhood and of the roads. It might become ordinary traffic later on; and the Court pointed out that they were only dealing with the one year before action. So the company has to pay the Council and all the costs.

The great cities of the United States are recognising that haphazard construction is economic waste and destruction, and that if the city of 1950 is to be immeasurably a better place in which to live than the city of 1920, there must be a greater public regulation and restriction of the use of land within its borders. The zoning system—more properly designated the districting system—applied to city planning, as defined by the Board of Estimate and Apportionment of New York City, embraces "a comprehensive plan for the control of building development of private property," and restricts the use of such property by regulating the use of buildings erected, by regulating the height of such buildings, and, further, by regulating the size of buildings with respect to the area of lot occupied. The principle has been applied in recent years in several American States. Its first adoption, however, in the comprehensive plan of a metropolitan city was the enactment, on July 25, 1916, of a districting law affecting the entire metropolitan area of New York City. Philadelphia has now authorised the appointment by the Mayor of a Zoning Commission, which is actively at work upon the draft of a law to effect the carrying out of the district principle in that city. The power of restriction is derived from the exercise of police power of government, which makes for the public health, safety, convenience, comfort, and general welfare. It is one of the most difficult to define and limit and must be reasonably applied. The question as to how far a property owner, in the assertion of his fundamental individual rights as a free citizen, may use his property as he pleases to the disadvantage of his neighbour's property, or to the public detriment, is one ripe for determination. Citizenship in a democracy at first resents restrictions upon individual rights. These are generally interpreted to mean the doing of what one pleases with his own, irrespective of how such action may affect the right of others to do as they choose with their own. Like some of our own town-planners—at East Birmingham, for instance, those in America will doubtless make blunders. These are best avoided by free discussion—by experts, not by mere enthusiasts, and by the association of the landowners and their technical advisers with committees of local authorities charged with the inception and execution of schemes. In the April issue of the "Proceedings of the Engineers' Club of Philadelphia" will be found an excellent illustrated symposium, contributed to by four well-informed writers, which we regret our present limited space does not permit us to reproduce. All interested this side can obtain copies, post free, for 50 cents from the Secretary of the Club at Philadelphia.

The case of the British Reinforced Concrete Co., Limited, *v.* Lind, which came before Mr. Justice Eve, in the Chancery Division, on January 17, 18, and 19 last, should be noted. We cannot spare space for the report, but it will be found *in extenso* in the Illustrated Official Journal of Patents Supplement of last Wednesday. The company entrusted, through a chief engineer in charge of the drawing office, Lind, a draughtsman or assistant engineer, with the preparation of designs for linings of headings in a certain colliery. In the absence of personal experience of similar underground work, and of reliable data as to the earth pressure at the particular colliery, he was unable to prepare a satisfactory design, and suggested that he should visit the colliery. With the information acquired on his visit, he made a report stating the essential conditions, and prepared some designs, none of which complied with all of those conditions, but one of the designs was considered by the chief engineer to be feasible. Lind then informed the chief engineer that he had made an invention of a method of construction that would enable compliance with all the conditions. Immediately after, Lind applied for a patent for that invention, and informed the company of his application. The patent was subsequently granted to Lind. The company brought an action against him for a declaration that he held the patent as a trustee for the company. At the trial, the defendant contended that he had been engaged to perform the duties ordinarily performed by a draughtsman or assistant engineer, not to make inventions. It was held that after the visit of the defendant to the colliery, the terms of his employment imposed upon him an obligation to produce, by the exercise of his industry, skill, ingenuity and inventive ability, the best design he could, complying with the essential conditions of the work, and that his obligation did not determine when he had prepared the designs submitted to his employers before he applied for the patent; and that he

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must be declared to be a trustee for the plaintiffs as to the patent, and also as to other rights acquired in respect of the invention, notwithstanding that some of them included improvements; but that he was entitled to be indemnified by his beneficiaries, the plaintiffs, against any expenses properly incurred. Judgment was given for the plaintiffs with costs.

In giving judgment, his Lordship said:—"I do not attribute, and I am glad not to be constrained to attribute, anything in the way of a dishonourable or improper motive on the defendant's part, but I think he was ill-advised by his friends when he was told, as he tells us he was told before he applied for the patent, that according to the law of this country he could in the circumstances apply for that patent and retain the benefit of it for his own use. In my opinion, the terms of his particular employment imposed upon him a duty and obligation, and it is inconsistent with that duty and obligation that he should be allowed to retain for his benefit the results of the skill and inventive ability which, in the discharge of his duty to his employers, he applied to this particular matter. It has been said that the granting of any such relief as the plaintiffs claim in this case will work hardship on the defendant in that, in addition to having the defendant declared a trustee of the Patent No. 22,663 of 1914, the plaintiffs are claiming that he is also liable to account to the plaintiffs for the further rights which he has obtained in respect of that patent. It is said, further, that, so far as the main patent is concerned, the defendant has made some arrangements, under which, in the events which have happened, other persons than himself are now interested in it. But that argument is one which is always urged on behalf of a trustee who, under a mistake as to the beneficial ownership of property legally vested in him, has, in fact, dealt with the property as though he was not only legal owner but beneficial owner also. A person who, having a lease vested in him as a trustee, and possibly not realising that he is a trustee, applies for a renewal of it, is a trustee not only of the original lease, but of the renewed term, and any benefits attaching to it that he may have obtained by virtue of his legal ownership of the original lease. So, here, it appears to me that, by virtue of this gentleman's legal ownership of the patent, he has been in a position to obtain further advantages with reference to the invention, and that, in the same way as he has to account to the plaintiffs for the original patent, he is accountable to them for any advantages which have flowed from his legal ownership of that which was their beneficial property throughout. Accordingly, I think the plaintiffs are entitled to the relief which they claim in this action, and there must be judgment to that effect, with an order for the payment of the costs. The judgment extends to the other rights acquired in respect of the invention notwithstanding that some of them include improvements. The defendant is, as trustee, entitled to be indemnified by his *cestuis qui trust* against any expenses properly incurred."

The Imperial Arts League has done good work during the year covered by its eighth annual report, and its financial position is satisfactory, with a slight upward tendency. Among its various activities may be mentioned a well-timed protest against the haphazard valuation by the Commissioners appointed to compensate the uninsured exhibits at the Royal Hibernian Academy during the Dublin riots, its support of the Royal Academy's protest against the National Gallery Bill, and especially its valuable aid to artists menaced by shabby treatment in the art market. Four special cases are noted. Damages were obtained for a sculptor, whose altered and adapted work was placed on the market by a firm in whose possession had remained the mould of an original figure which he had designed as part of a public memorial. The rights of tenants regarding the removal of fixtures, which are so often in doubt, required careful consideration in the position of an artist who had added a gallery to his studio and wished to pass it on to his successor. The right of the introducer of a client to a commission for business done, other than that originally proposed, has had to be considered from the point of view of artists' custom as well as with reference to the state of the law which often leads to disputes on commission claims in the City, or in respect of the purchase of estates. Artists believe their interests to lie in a generous interpretation of the claims of the introducer, dealer or agent. In the usual absence of a formal contract, an important point arose in the case of the liquidation of a large art firm as to whether the benefit arising from our member's agreement was assignable to the liquidators, and, if so, for how long they could hold up the artist's work by neglecting to exercise their rights of exclusive sale. The Duke of Rutland's speech at the annual meeting was an appreciative and an encouraging one, and should add many more members to an association which, without fuss or favour, is really doing good service to art and artists.

"GUESSTIMATE AND JESTIMATE."

A fortnight ago we referred at some length to the appeal made by the directors of the Master Builders' Association of Boston, U.S.A., to architects and builders to unite in an effort to remedy the evils of present-day competition in building work, and gave their conclusions, at the end of which more was promised about the same in the Association's next "Monthly Letter." That has just reached us, and the continuation of the subject is handled as vigorously as in the previous issue.

Architectural competitions, it is pointed out, are a bone of contention among architects. Already they have eliminated price competition, for exactly the same good reasons that make it undesirable among contractors, leaving their race for business upon the basis of quality, efficiency, and ability. Of course "pull"—meaning friendship, social connections, or politics—will always play a part, but this is aside from the general progress of the business. For years architects have distrusted architectural competitions even with a well-selected list of entries, and involving only quality of result. The reasons for this suspicion are partly different from those affecting a competition among builders; but such things as lack of appreciation of quality, personal favouritism, and inequality of competitors are faults in any competition, and, of course, arise from mistakes, ignorance, and bias of the judges.

In an address delivered in Baltimore in February, 1916, Mr. R. Clipston Sturgis, a Boston architect prominent for his work and for the official positions he has held, spoke as follows:—"Now, there is another malign condition that interferes with the good work that we are capable of doing, because there are no better mechanics, and there never have been any better mechanics, in the world than there are to-day. You know that just as well as I do. You know perfectly well what are the results of competitive bidding, when you are all scribbling to get down to the lowest possible limit, and you say, 'If I get this contract I will even it somewhere or somehow down the line.' You all know just as well as I do that the owner is a poor helpless individual in the hands of a good contractor or a bad contractor, or a good architect or a bad architect; he does not know whether he is afoot or horseback; he has got to take practically what is coming to him; he does not know how his bricks are laid, or how the mortar is made, or any of the other innumerable things that go to make up the building, or how to make it either good, bad, or indifferent; and it rests with us to try to change something in that competitive system. We cannot get rid of it. We might just as well accept the fact that competitive bidding is here to stay. It is here to stay for the present, at all events. But my own feeling about the competitive system is that one reason why it is here to stay is because nobody will trust anybody else; because as a nation we distrust everybody, as a nation we are not straightforward and absolutely honest, and no one expects any sort of disinterested service. The moment anyone proposes to do something that on the face of it seems disinterested, they want to know what is behind it. And there is something generally behind it. Now, the result of competition, you know just as well as I do, is in the lowering of standards. It means that a general contractor will accept as his sub-contractors men that he would not ordinarily choose, but he does this because when there are bids he wants to get the contract. When they get on the job it means scamped work and material, hurried work, not giving the owner what he thinks he is going to get; I will not say what he has paid for, because probably, under the competitive system of prices, he is perhaps getting his money's worth, but he is not getting what he expects; he is not getting what he thought he ought to get. Now, until you can bring home to the community the fact that there are some honest people left in this country, and that you can trust some people, you never will be able to put the competitive system on a better and firmer basis."

Estimating is, or should be, an exact science. It is usually a fact that a very few contractors might be chosen whose estimates will be even, consistent, and carefully made, because they are from men who practically know in advance how much profit they will get—whose bids will be so nearly alike that variations are purely accidental, and therefore the low man among them will be a matter of chance.

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When two or three such are in a group of bidders on a piece of work, they know that chance determines their place in the list of prices as rendered, and they also know what their chances are with the rest of the list. Experience tells them who is likely to be low and who high, as well as who is careless or plunging, as evidenced by wide variations in position upon lists of prices on many jobs.

It is interesting, remarks the directors of the Boston Master Builders' Association, how tenaciously some architects hold to the assumption that bidders upon work do not know who is estimating. Many architects refuse all information—even to sub-contractors who wish to send bids to all. This is only causing a little extra trouble: the list becomes known very quickly, and a little effort determines it a day or two after invitations are sent out. Two or three Building Trade Reports are after it, sub-contractors get inquiries for prices from several general contractors, general and sub-contractors compare notes—and the easy puzzle is solved. Some architects have dropped the fiction, and frankly issue their circular letter of invitation to the entire list, naming them upon each letter. May the practice spread! The information is helpful because all are then upon the same basis, instead of only a part of them knowing those with whom they have to compete. It is likewise true that bidders very frequently know the various bids upon a piece of work. Comparing notes, direct information to some of them, or other roundabout means, usually have to suffice. The practice now followed by some offices of sending out to each bidder a list of the prices, with or without the bidders' names attached, is an advantage to the business, fulfilling some of the good of an open-price association.

While a careful and experienced contractor finds only a very small variation between estimated and actual costs, it is, of course, apparent that accuracy is by no means essential to his pocket-book, if that alone is to be considered. It has been shown that any contractor may "cut corners" and vary the cost of a job twenty per cent. If he is low on any part, he may sacrifice quality in that part, and need not fear any consequence from architect's supervision or attempted enforcement of contract clauses. In court a jury is with the contractor—because there are no standards usually in building operations, and a jury is inexpert and unable to ascertain the truth in a dispute on quality. Therefore, when a good contractor finds himself in a list of bidders whom he knows he cannot beat by price, he may cut his quality if he chooses. The easiest way to do this is by using low sub-estimates. Moreover, the average list of bidders contains men doing a low quality of work; the good men must do some work or quit business; and the result is that some diminution in quality is expressed by bids from good men, as a practical human necessity. One good contractor recently said that never but once did he do a job as well as he could. The effort, with a good man, is to do his work to the entire satisfaction of owner and architect. This is not a high aim, but is as much as can be expected. After a time defects may develop in the work—not easily foreseen and not anticipated by those whose satisfaction has been gained previously. Then, too, much time has passed and proof of lowered quality of original output cannot be made. The owner pays the bills.

Estimating, then, often need not be exact so far as practical purposes are concerned. The owner gets what he pays for. The contractor bids where he hopes to stand a show of winning—and can squeeze his profit out at his pleasure. What kind of a way is this to do business? There was once a contractor in Boston—well regarded and doing his share of work—who always estimated as follows: First, he went over the plans and worked out the cost of the job from his experience on other jobs. Then he counted the specification pages and added ten dollars a page to cover specific matters not found in an average job—to cover variations from the average. Thus was his bid prepared. The method has merit, and is sufficient for many contractors of to-day—or any other day—especially when it is considered how under present competition practice the price of the good contractor, and therefore his quality, is driven downward by the necessity of doing some business and earning a living.

WHAT IS THE TREND OF ALL THIS?

The common corruptions of the word "estimate" into "guesstimate" and "jestimate" are useful and instructive:—

"Bid low and the world bids with you,
Bid right and you bid alone."

The "cost and percentage" method of letting a contract is one of the latest developments. A good contractor is naturally better informed about costs than is an architect. One great trouble for an owner is the tendency of early estimates, or architects' approximations, to be less than the final figures. There are various reasons for this. In some instances the contractor has been chosen when the architect was selected—and was instructed to work with the architect throughout the preparation of plans and specifications, making up a sort of progressive estimate, at first rough, but being perfected with the plans, to the end that the final plans were for a piece of work that the contractor would build for the price originally named by the owner. Of course this procedure involves an assumption of honesty on the part of the contractor. Is this too much to expect?

The method followed by some architects of covering many important parts of the work by "allowances" is, of course, only a variation of what is here suggested, for it means only that certain parts of the work are not included in the items upon which the general contractor must get bids (subject to his temptation to use low ones!).

The whole matter is summarised as follows:—

1. In competition general contractors should be chosen more carefully.

2. General contractors usually are masons, carpenters (or "brokers"). Take bids on two divisions only, masonry and carpentry, for comparison purposes. Consider the man (or men) who are sub-bidders in this summation (for some parts of both lines of work will be sub-let). If the general contractors are all carpenters or all masons, call for bids on that branch of work only, placing the other branch in sub-contract list.

3. Pay five per cent. commission for handling all sub-contracts—stipulating that all will be included, that responsibility for sub-contractors' work will not rest upon the general contractor, and that the general contractor will not be held financially responsible for errors, omissions, or disputes arising out of work of a sub-contractor.

4. When the general contractor submits these sub-bids, it is to be with the understanding that they are not a part of his own estimate, but will be considered with others similarly obtained, and that the finally approved list may bear no relation to the one he has submitted.

5. Do not value promises as to time of completion—investigate the results obtained in other cases, and award no contract because of such a promise.

6. In getting guaranteed maximum prices, with various other devices already explained, apply similar provisions.

7. In selecting one general contractor without competition, reserve similar rights as to selection of sub-contractors.

We should like to see these axioms discussed this side. Many who might have done so with advantage are of course far too busily engaged otherwise to do so; and the time of year is upon us when few will have the opportunity. But if any informed readers have the time and inclination, our columns are open as far as our present limited space will allow.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

ANNUAL GENERAL MEETING.

The annual general meeting of the Royal Institute will be held on Monday next, at 5.30 p.m., to read the minutes of the special and business general meetings held Monday, March 5, 1917; formally to admit members attending for the first time; and to consider the annual report of the Council for the official year 1916-17, copies of which will be available at the meeting.

THE ANNUAL REPORT.

Since the publication of the last annual report the Council have held fourteen meetings. Fourteen committees appointed by the Council have met and reported from time to time on the matters referred to them; particulars of the work of some of these committees are embodied in the report.

The losses by death have been as follows:—

Fellows.—Henry Greig Badenoch, Hippolyte Jean Blanc, Robert Alexander Briggs, Edward Cratney, Edward Greenop, George Thomas Hine, Edward Robert Robson, Richard Phené Spires, Ernest Montague Thomas, Edward Thornton, Ernest Willmott, Joseph Foster Wood.

Associates.—David Bird, Theodore Knolles Green, Charles Rennels Hancock, Robert Henry, Charles Robert Baker King, Harold Beckwith Richards.

Licentiates.—Christopher de Adlersparre, William Wallace Blair, Charles William Bell, James Edwin Benton, Andrew Francis Stewart Bryden, John Powell Edwards, Thomas Francis Hewitt, Gilbert Higginbottom, Richard Nicholl Hodder, Edwin Cecil Lawrence.

Retired Fellows.—Colonel Edward Appleton, Frederick William Burwell, John Hebb, William Leiper, Ralph Nevill, Alexander Payne, Charles Trubshaw.

Honorary Associates.—James Burgess, Archibald Dunn, Sir James Dromgole Linton, P.R.I.

Honorary Corresponding Members.—Charles Jean Melchior, Marquis, De Vogüé, Chevalier Victor Eugène Louis De Stuers.

In addition to the above the Council record the loss of four Fellows, twenty-five Associates, two Licentiates, eleven Students, one Hon. Fellow, and one Hon. Associate, who have fallen in the war.

MEMBERSHIP.

The following table shows the present subscribing membership of the Royal Institute compared with corresponding periods in 1913, 1914, 1915, and 1916:—

	Fellows.	Associates.	Hon. Associates.	Total.
1913 ..	847 ..	1,630 ..	54 ..	2,531
1914 ..	852 ..	1,695 ..	56 ..	2,603
1915 ..	857 ..	1,713 ..	54 ..	2,624
1916 ..	852 ..	1,679 ..	52 ..	2,583
1917 ..	842 ..	1,656 ..	48 ..	2,546

During the official year since the last annual general meeting nineteen Fellows and twenty-three Associates have been elected as against thirty-three Fellows and forty-four Associates the previous year. There are now 1,890 Licentiates on the roll as against 1,919 last year. Since the publication of the last annual report eleven Licentiates have passed the examination qualifying for election to the Fellowship, and nine of these have been duly elected as Fellows. Under the new regulations the preliminary examination qualifying for registration as Probationer has ceased to be held, and candidates for Probationership are required to furnish to the Council satisfactory evidence of their attainments before being passed for registration. From November, 1915, when

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the last preliminary examination was held, until March, 1917, fifty candidates have satisfied the requirements and have been registered as Probationers.

The large majority of Probationers and students of the institute being on military service, it was decided to hold the intermediate and final examinations once only during the official year—viz., in June—and the autumn examinations were dropped. The following table, giving the results of the examinations, shows that seventeen students only have been added to the register during the year, and that thirteen candidates have passed the examination qualifying for associateship:—

	Intermediate Examination.	Final and Special Examinations
Admitted	18	20
Exempted	14	—
Examined	4	20
Passed	3	13
Relegated	1	7

On the recommendation of the Board of Architectural Education it has been decided to hold the final and special examinations in India provided satisfactory arrangements can be made. The first examination would be held in Bombay.

The statutory examination qualifying for candidature as district surveyor in London, or as building surveyor under local authorities, was held in October, and resulted in the passing of two out of the three candidates who presented themselves for examination.

The Council tender their grateful acknowledgments to the honorary examiners for their arduous labours in connection with the examinations.

GRANTS.

Since the issue of the last annual report the Council have made the following grants:—Architectural Association, £100; Architects' Benevolent Society, £100; A.A. Active Service Committee, £21; London Society (towards expenses of Charing Cross Bridge Bill petition), £10 10s.; British School at Rome, £3 3s. In addition to the grant to the Architectural Association, the Council have been enabled to obtain for that body a further sum of £200 from the Jarvis Trustees.

ROYAL GOLD MEDAL.

The Royal Gold Medal was awarded to Sir R. Rowand Anderson, LL.D., F.R.S.E. [*F.*]. Sir Robert was, unfortunately, not well enough to be present in person at the presentation meeting, and the medal was received on his behalf by Sir Robert Inches, Lord Provost of Edinburgh. It has been decided to award the medal this year to the distinguished French architect, M. Henri Paul Nénot, Membre de l'Institut, architect of the New Sorbonne, Paris [*Hon. Corr. M.*], in recognition of the merit of his executed work. His Majesty has graciously signified his approval of the award, and the presentation will be made to M. Nénot at the general meeting on June 25.

THE WAR.

The work of the Royal Institute continues to be seriously affected by the war. The programme of sessional papers remains suspended, only business of a routine and uncontroversial nature has been transacted at the general meetings, and the prize competitions for the year have again been postponed.

Members who have joined the Forces since the outbreak of war now number seventy-two Fellows, 513 Associates, 312 Licentiates, and 293 students. Since the last annual report the following have fallen:—

Fellows.—Alfred Edward Corbett; Herbert Phillips Fletcher, D.S.O., Croix de Guerre; Arthur Alderson France, George Augustus Bligh Livesay, Andrew Danskine Aitken, Thomas Paul Bausor, James Bennett, James Ellis Braithwaite, Joseph William Bull, Joseph Berkeley Cubey, Arthur Michael Durrant, Douglas Morley Griffin, Francis Grissell, John Kingston Ground, Noël Waugh Hadwen, Matthew Honan, Charles Ernest Lovell, Gilbert Marshall Mackenzie, Alfred Wyatt Papworth, Ernest Scott Petch, Richard Manning Haig Philp, Percy Cunliffe Pilling, William Jackson Pywell, Tom Sadler Rushworth, Charles Stonehouse, Edward Woodhouse Stubbs, Robert Victor Sturgeon, Joseph Henry Taylor, Philip Edward Webb, Arthur Winch.

Licentiates.—Balfour Abercrombie, Arthur Cyril Caudwell.

Students.—Arthur Samuel Bagshawe, Lawton Stephen Ford, Donald Jervis Gordon, William Harold Hillyer, Alick George Horsnell, William M. Jenkins, Henry Franklin Paterson, Alfred Edwin Shapley, Alfred Edgar Stott, Walter R. Westwood, Stanley W. Woodley.

Honorary Fellow.—Field-Marshal Earl Kitchener of Khartoum.

Honorary Associate.—Sir Hay Frederick Donaldson.

Altogether the Institute has lost in the war 1 Hon. Fellow, 1 Hon. Associate, 4 Fellows, 38 Associates, 9 Licentiates, and 23 Students.

Since the last annual meeting the secretary and the chief clerk have been called up for the Army. The Council are extending to them the consideration that has been accorded to other members of the staff, and are supplementing their military pay in order that they may suffer no diminution of income whilst on service.

WAR APPOINTMENTS FOR ARCHITECTS.

In a letter to Mr. Lloyd George when War Minister the president drew attention to the fact that many highly-trained young architects were being wasted in the ranks of ordinary line regiments, and suggested that they should be appointed to Cadet Corps with a view to being granted commissions in the Royal Engineers. Numerous architects have since obtained commissions in this way.

As a result of a personal protest to the War Office against the claims of architects being ignored for such appointments as supervisors of buildings for Army purposes in France, the president was asked to nominate five architects for such posts. This was done, and it is understood that their work has been highly satisfactory. The president is endeavouring, in conjunction with the Surveyors' Institution, to get substantive rank for professional men employed in this and similar work, and the War Office has the matter under consideration.

Application having been made to the Institute by the War Office for men able to speak French to arrange for billeting in connection with the British Forces in France, the requirement was made known, and architects found capable of filling the position were appointed.

The president has been in communication with the War Office with the object of securing for architects appointments in conection with billeting troops in England, and it is understood that architects qualified for this kind of work will be appointed as occasions offer.

In connection with the Order in Council made last July imposing restrictions upon private building, the president has accepted an honorary position at the Ministry of Munitions for the purpose of carrying out a system of inspection to ensure that buildings in course of erection are not stopped without regard for their protection and security. The staff of inspectors is composed of architects accustomed to deal with buildings of every kind, and care is taken to administer the Order with scrupulous fairness.

Endeavour has been made by the president to secure the appointment of architects as inspectors of labour at munition factories in course of erection. He has also been instrumental in securing for owners of Controlled Establishment Canteens the right of employing their own architects for the preparation of plans.

WAR EMPLOYMENT FOR ARCHITECTS.

The Institute has supported during the year the various organisations which it was instrumental in promoting, and on which it is represented, with the object of assisting architects whose practices have come to a standstill in consequence of the war. This has been effected either by finding them positions in Government and other offices, or by granting them financial aid.

Representations have been made to the Reconstruction Committee as to the desirability of passing plans for asylums and other buildings during the present period of slackness in architectural work in order that the plans may be prepared at once in readiness for use at the restoration of peace. The Reconstruction Committee are in communication with the Board of Control on the subject, and favourable consideration is anticipated.

ARCHITECTS AND NATIONAL SERVICE.

A deputation arranged by the R.I.B.A. and the Architects' War Committee, and consisting of representatives of the R.I.B.A. and its allied societies, the Architectural Association, the Society of Architects, and unattached architects, waited upon Mr. Neville Chamberlain, Director-General of National Service, to urge in connection with the National Service scheme the utilisation of architects by the State for the special services for which their training has fitted them. The deputation was very sympathetically received, and Mr. Chamberlain approved a proposal put before him that the profession should appoint a committee to confer with him from time to time and suggest the kind of work that architects were qualified to undertake. An advisory council, representative of the whole profession, was at once formed, and an appeal has been published urging architects to sign the National Service form and send it to the R.I.B.A. or to the allied society of their district, in order that the forms may be all sent in together as a united offer from the whole profession. The advisory council has also in preparation a list of the services in which architects are likely to be useful, which is to be sent to Mr. Chamberlain with a suggestion that his Department should indicate the nature of the vacancies it is desired to fill.

CONDITIONS OF CONTRACT REVISION.

The Conditions of Contract Revision Committee, who have held thirty-eight meetings, have had under review a large number of documents and legal decisions relating to the subject referred to them, and considerable progress has been made with the work of revision. The committee hope shortly to be in a position to present a report to the council.

AUSTRALIAN PARLIAMENT HOUSE COMPETITION.

The Government of the Commonwealth of Australia having decided upon the resuscitation of the competition for the Federal Parliament House at Canberra, which had been postponed at the outbreak of war, the council, on the appeal of the Royal Victorian Institute of Architects, and supported by the principal French architectural societies, strongly protested to the Commonwealth Government against the competition being proceeded with at the present time, pointing out that all the architects of Great Britain and the Allied nations who were of military age, and large numbers also of the architects of the Overseas Dominions, were serving with the Forces and unable to compete—hence the competition would be practically confined to neutral countries, and would be in no sense international as originally intended. The Commonwealth Government declined at first to postpone the competition, but a further remonstrance was made by the council through the High Commissioner in London, and eventually a cablegram was received stating that it had been indefinitely postponed.

OTTAWA GOVERNMENT BUILDINGS COMPETITION.

A complaint reached the Institute that in the competition for the new Departmental and Courts Buildings at Ottawa the Dominion Government were not fulfilling the obligations to competitors as set out in the general conditions for competition designs, the terms of which had been considered and approved by the Institute. The Council, in consultation with the Competitions Committee, addressed a letter of protest to the Deputy Minister of Public Works, Ottawa. The Minister, in reply, made concessions which the Council consider will afford a satisfactory temporary settlement, and it is hoped that other proposals made by the Council in the interests of fairness to the competitors will be adopted by the Dominion Government and be carried into effect when the final stages of the competition are proceeded with after the war.

(*Continued on page 389.*)

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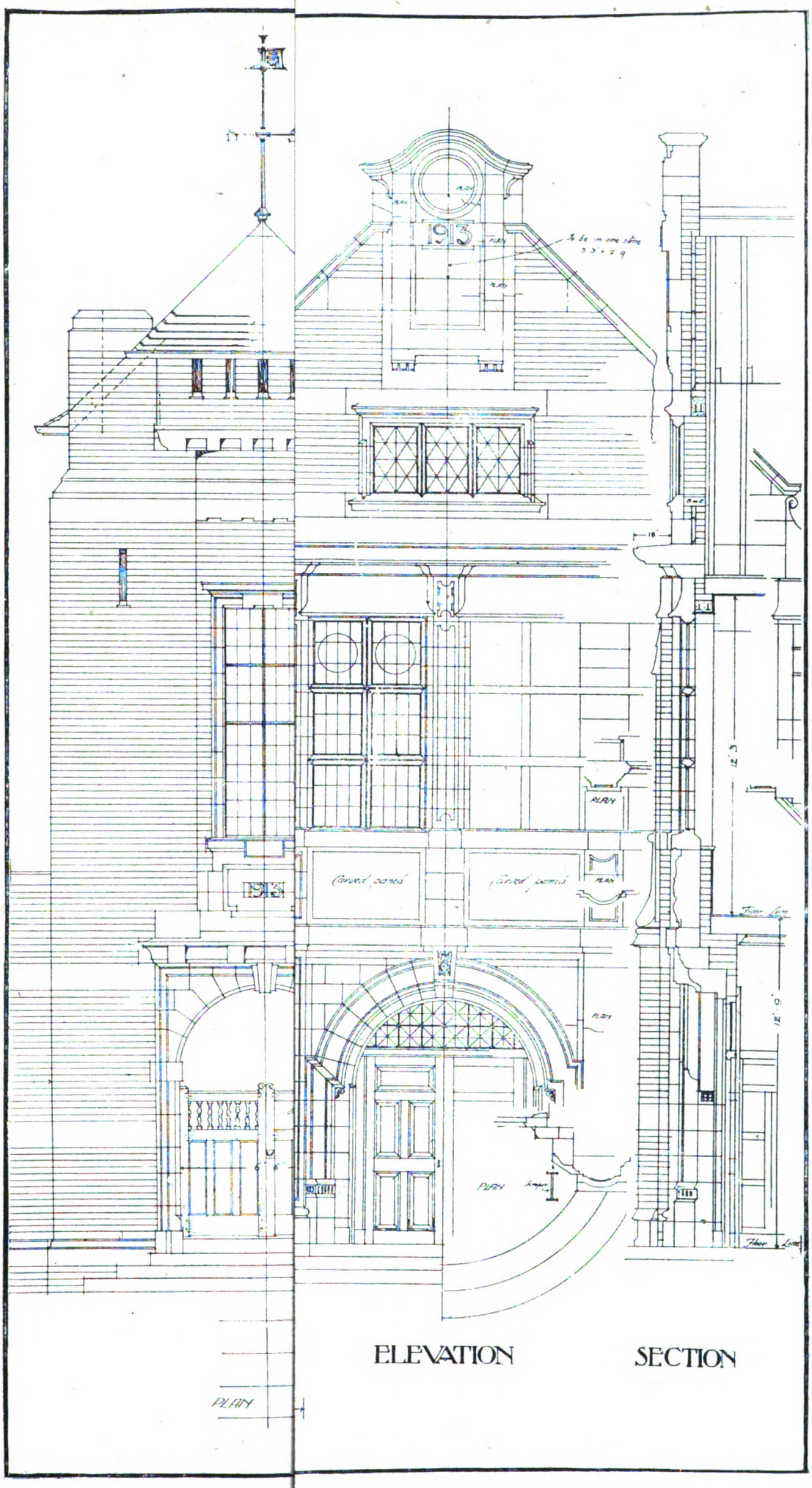

STOCKTER AND QUADRANGLE.

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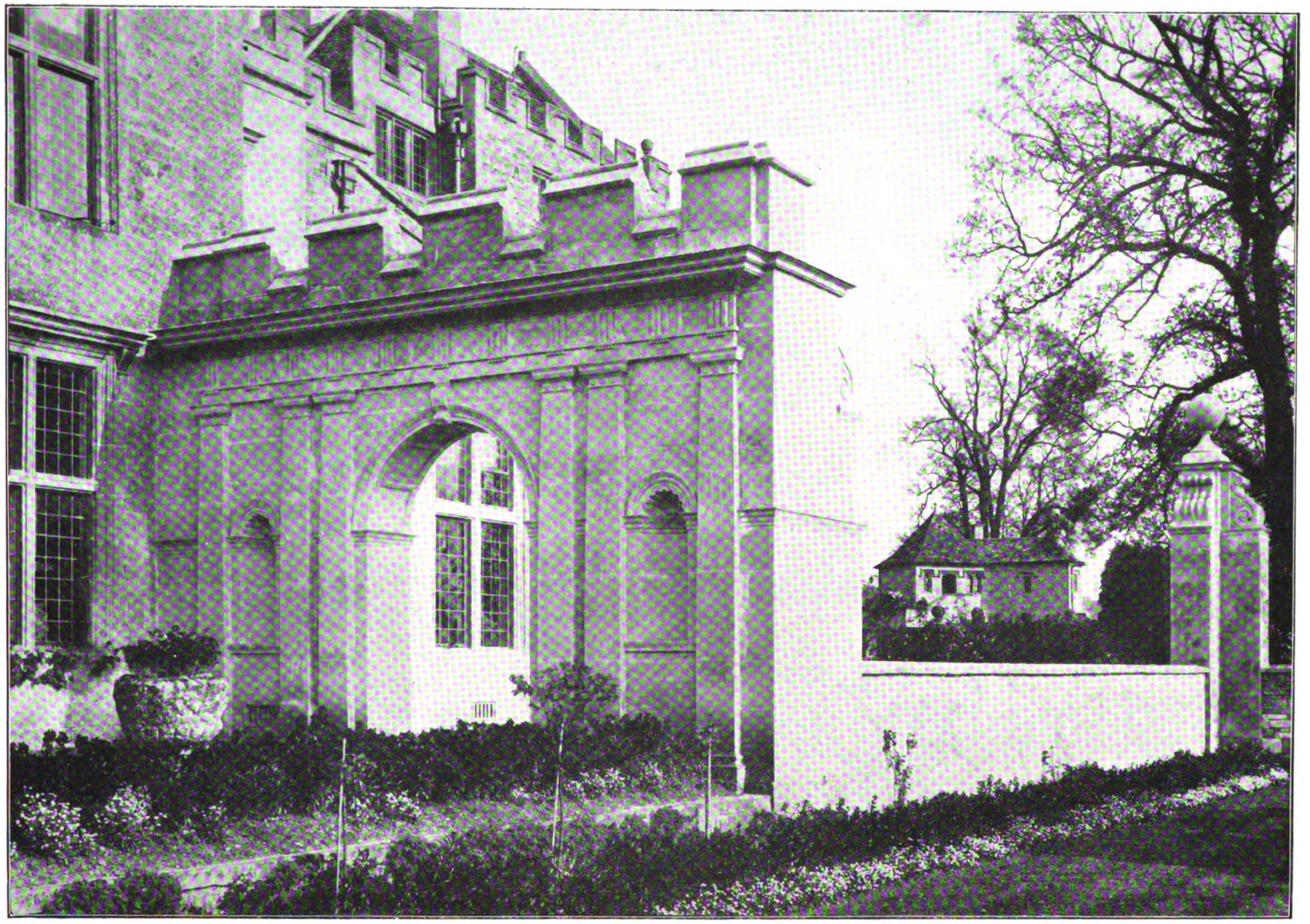

Cyril Ellis, Photo.]

STOWELL PARK, GLOUCESTERSHIRE: THE SOUTH TERRACE, E. END.
(For the EARL OF ELDON, D.L.)—Mr. SYDNEY J. TATCHELL, F.R.I.B.A., Architect.

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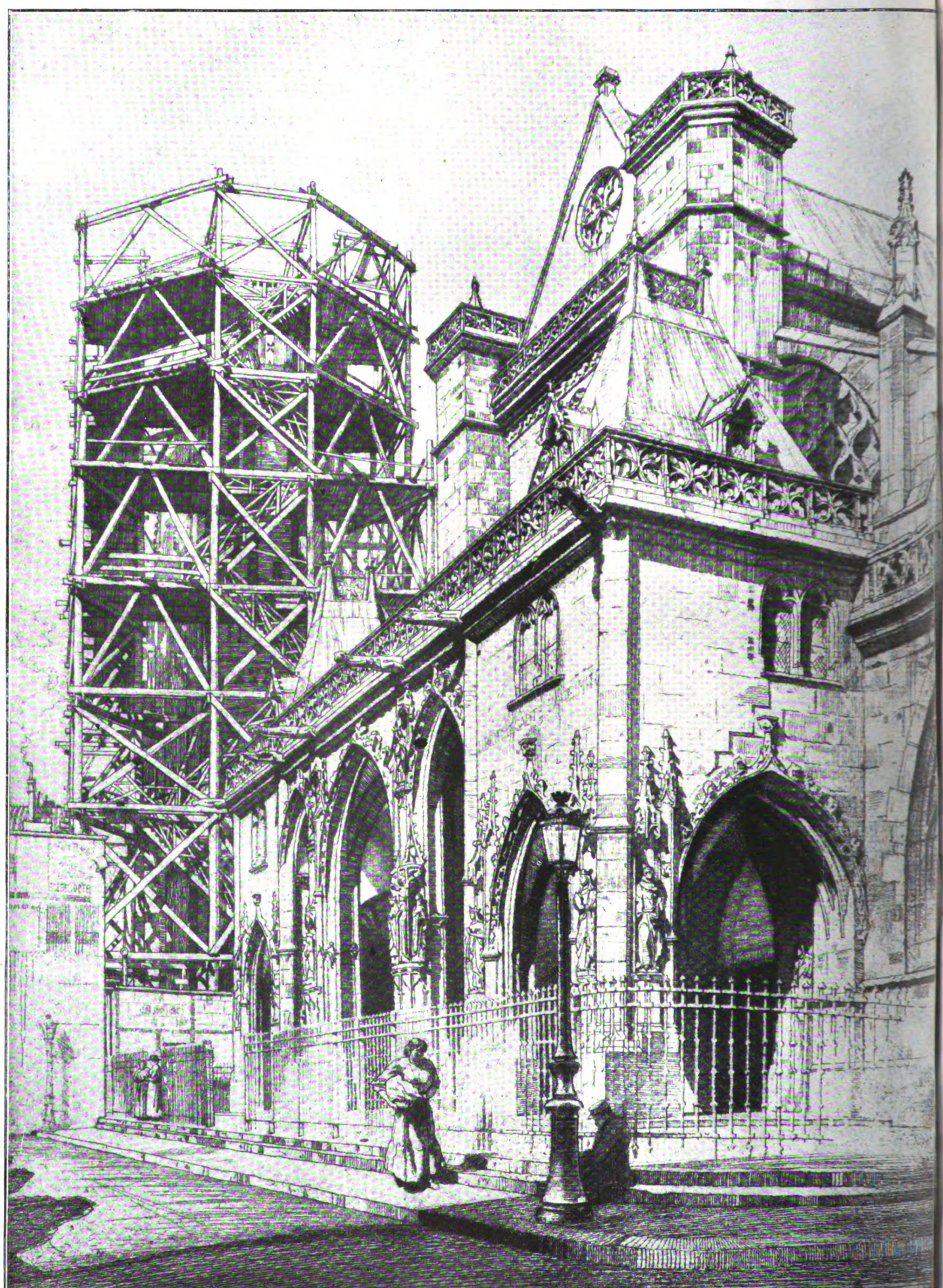

CHURCH OF ST. GERMAIN L'AUXERROIS AND THE PONT NEUF, PARIS.

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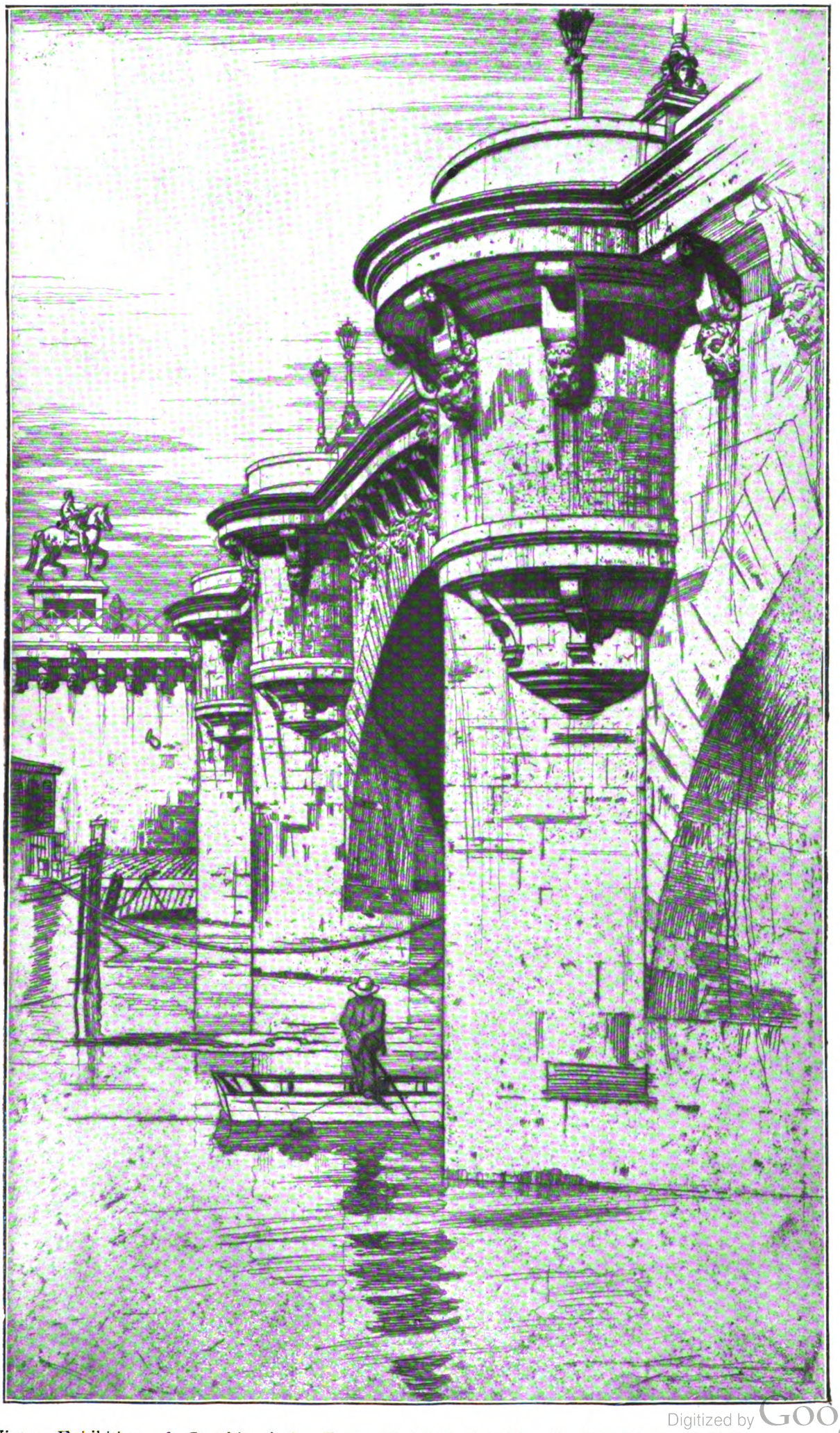

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ademy Winter Exhibition of Graphic Art).—From Etchings by Mr. R. Ray-Jones, A.R.E.

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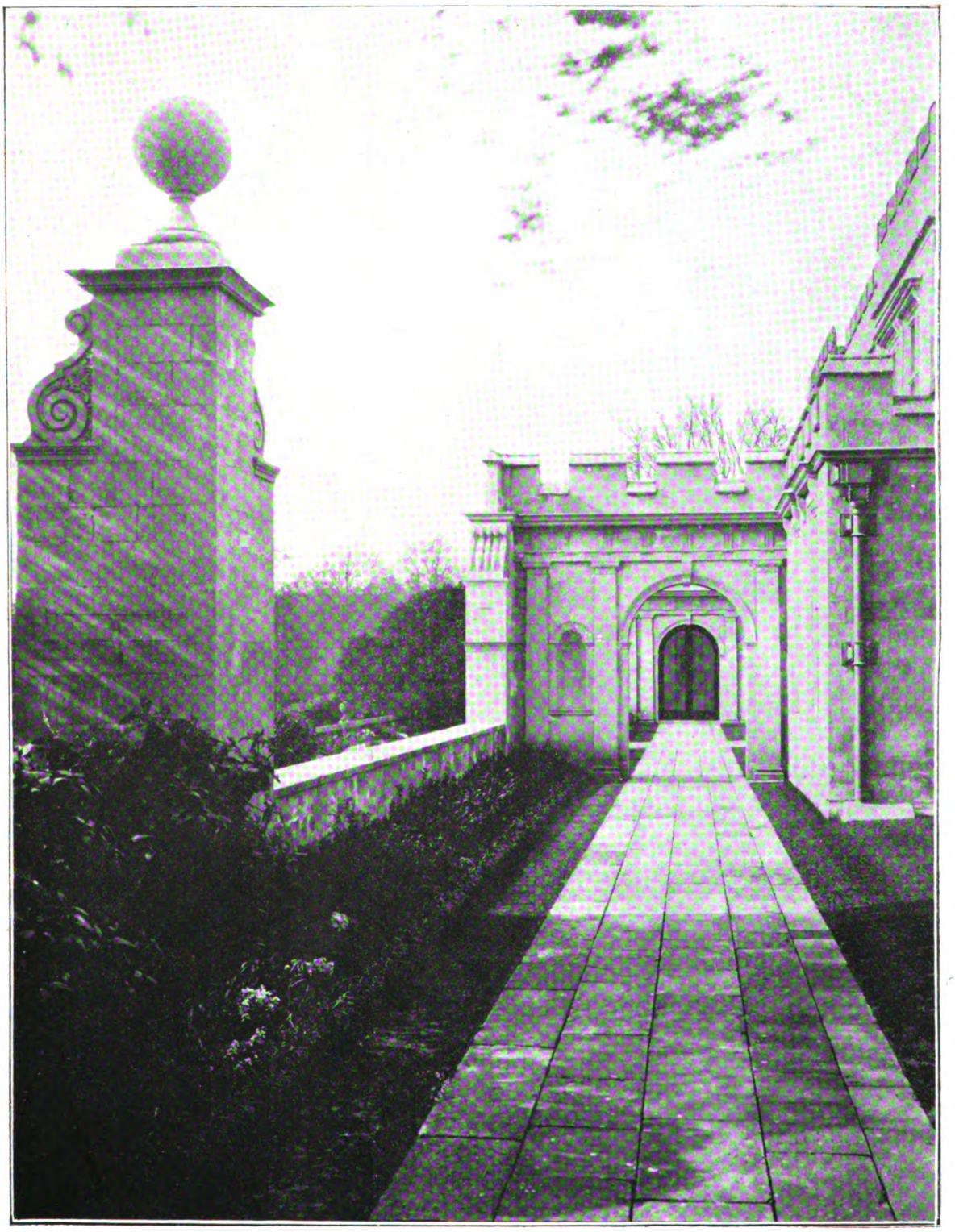

Cyril Ellis, Photo.]

STOWELL PARK, GLOUCESTERSHIRE: SOUTH TERRACE.

(For the Earl of Eldon, D.L.)—Mr. Sydney J. Tatchell, F.R.I.B.A., Architect.

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Our Illustrations.

ST. GERMAIN L'AUXERROIS AND PONT NEUF, PARIS.

(Royal Academy Winter Exhibition of Graphic Art.)

The two etchings from Paris by Mr. R. Ray-Jones, A.R.E., are reproduced to-day by the permission of the Fine Art Society, New Bond Street. They are both well placed at the Royal Academy, and the artist has sent us the following descriptions:—This church stands in the Place du Louvre, opposite the east façade of the old Louvre. It was founded in the seventh century, and dates in its present Gothic form from the twelfth—sixteenth century. The façade is pierced with a rose window of Flamboyant tracery, and is flanked by two hexagonal turrets, and is preceded by a porch, on the groining of which, if I remember rightly, are faint traces of colour. From a little bell-tower to the right of the transept the signal for the Massacre of St. Bartholomew was given on August 24, 1572. The interior consists of nave and double aisles, and has a low roof. There are seven or eight chapels containing monuments, paintings, etc., and in one a Tree of Jesse, in stone, of the fourteenth century. The pillars of the choir were converted into fluted columns in the eighteenth century. The Chambre des Archives, formerly the treasury, is reached by a spiral staircase. This is a paved room dating from the eighteenth century, in perfect preservation, with a wooden ceiling and a cupboard, and lamp of the same period. The place in front of the church, with its tree-shaded seats, as in most French open spaces, is a much appreciated resting spot for the women returning with well-laden baskets from Les Halles (Central Markets) close by. The Seine is only a few paces away, and can be seen from the Place, and on reaching the end of the Rue de Louvre one sees the Pont Neuf bridging the two arms of the river resting midway on the western point of the Ile de la Cité. In spite of its name, it is the oldest bridge in Paris, and was constructed in 1578-1604, but was remodelled in 1852, the part shown in the etching being restored in 1886. The masks supporting the cornice are copies of those originally executed by J. B. D. Cerceau. The fine equestrian statue of Henri IV. by Lemot, halfway across the bridge, was erected in 1818 to replace one which stood there from 1635 to 1792, when it was melted down for cannon. There are two reliefs on the base representing Henri IV. distributing bread among the beseiged Parisians and causing peace to be proclaimed by the Archbishop of Paris at Notre Dame. The bed and mattress makers usually to be seen at work on the bank alongside the old bridge look very picturesque with their bright-coloured materials splashed with sunlight and their old-fashioned methods of dividing afresh the old mattress fillings. Anglers are generally numerous in the vicinity, and the old washing-boats, with the women reaching out to rinse their washing in the river water, also help the picture.

STOWELL PARK, GLOUCESTERSHIRE.

The work illustrated was carried out in connection with the extension of the lounge hall and other alterations on the south side of this mansion, the Gloucestershire seat of the Right Hon. the Earl of Eldon, near Cirencester. Estate workmen were responsible for its execution. The stone was quarried locally and worked on the spot. The atmosphere of ordinary contract work was remarkable for its absence, and, so far as possible under modern conditions, every endeavour was made—and with a large measure of success—to encourage the spirit of craftsmanship amongst the men. These conditions were maintained in connection with later and more extensive work in restorations and additions to other parts of the mansion. The experiment from every point of view proved most satisfactory. Moreover, an esprit de corps was established amongst the men, the value of which in work of this nature is incalculable. The cost under these conditions compared very favourably with contemporary contract work. The architect was Mr. Sydney Tatchell, F.R.I.B.A., of Westminster. We shall shortly give an illustration of the Winter Garden and the Badminton Court just lately erected at Stowell Park.

STOCKPORT GRAMMAR SCHOOL: DETAILS OF MAIN FRONTS.

Plans and views, with particulars, of this large and important block of buildings, lately finished for the historic Grammar School at Stockport, will be found illustrated in our issue of February 28 and March 21. To-day we publish a double page of working details of the visitors' main entrance facing the playing fields and the tower to the west façade, which marks the pupils' entrance leading to the cloisters and assembly court, of which photographs have already appeared. Messrs. R. H. Spalding and E. G. Theakston, FF.R.I.B.A., of Lincoln's Inn, are the architects.

OBITUARY.

With deep regret we announce the death of Captain George P. Denham, Argyll and Sutherland Highlanders. He was wounded in action on April 10, and died in hospital four days later. The deceased officer, an Exonian, was an artist of much promise, commencing his career at the Exeter Art School, where he won a scholarship admitting him to the Royal College of Art, South Kensington. Whilst a student at the College he won the £100 prize for a poster offered by the organisers of the Building Trades Exhibition in 1907. We illustrated a figure frieze for a drawing room at Craven Hill, Lancaster Gate, W., painted by the deceased, in our issue of March 3, 1911.

In the death of Mr. Andrew S. Biggart, chairman of Sir William Arrol and Co., Limited, Glasgow, there has passed away one who took a leading part under the late Sir William Arrol in the work of building the Forth Bridge. His death took place last Thursday at his residence, Inchgarvie, Sherbrooke Avenue, Pollokshields. Born in the Ayrshire parish of Beith fifty-nine years ago, Mr. Biggart entered the service of Mr. (afterwards Sir William) Arrol. When the firm obtained the contract for the construction of the Forth Bridge thirty-five years ago, Mr. Biggart, as resident engineer and general manager, was intimately associated with the execution of the contract from its inception to the finish. On the successful completion of the great undertaking, Mr. Biggart was assumed a partner of the firm, and he has taken a prominent part in carrying out many important bridge-building and kindred contracts throughout the country. When the firm was converted into a limited liability concern in 1893, Mr. Biggart became a director, and on the death of Sir William Arrol a few years ago he succeeded to the chairmanship of the board.

The Munster and Leinster Bank, Limited, contemplate spending £20,000 on their new premises in Lower Sackville Street, Dublin, for which Mr. L. A. MacDonnell, F.R.I.B.A., is the architect.

The Baths and Wash-houses Committee of the Poplar B.C. recommend the borough council to apply to the Local Government Board for sanction to borrow 10,000 for the erection of wash-houses and slipper baths at Bromley-by-Bow.

A large new church is to be erected at Athlone for the Franciscan Order. The cost will be about £20,000, and it will be dedicated to "The Four Masters." The church will be in the Hiberno-Romanesque style, and from the designs of Mr. T. J. Cullen, architect, Dublin.

The Establishment Committee of the London County Council has authorised the advance to the next higher sections of the following assistants and employees in the architect's department who had attained the maximum salaries or rates of pay of their respective sections to First-class, Section a:—E. C. Nisbet, R. J. Tall, J. E. Richardson, G. T. Smith, H. J. T. Kibblewhite, A. W. Toynton, A. A. Carden, J. M. Scott, W. E. West, and H. C. Boden. Second-class, Section a:—R. G. Stevens, E. W. Foale, F. C. Tiplady, H. J. Linnell, and S. Drew.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

(*Continued from page 376.*)

CHARING CROSS BRIDGE.

In the Session of 1916 the Institute, in conjunction with the London Society, successfully petitioned Parliament against the South-Eastern Railway Company's Bill, the passing of which would have the effect of retaining the unsightly railway bridge at Charing Cross and of deferring indefinitely the proposal for the much-needed road-bridge across the river at this point. The Bill is again before the present Session of Parliament, and the Institute and the London Society have again petitioned against it. The Bill, however, has passed the second reading and has been referred to a Committee of the House of Commons. It is intended to keep the Joint Committee of the Institute and the London Society in being with a view to their keeping in touch with the subject and taking such action as may be deemed expedient in case of further developments.

WAR ECONOMIES.

Owing to the depleted staff, the increased printing charges, and the shortage and great advance in the price of paper, the Council have been compelled to stop the fortnightly issues and to bring out the *Journal* monthly. As a further measure of economy the *Kalendar* has been suspended, its place being taken by a small pamphlet giving the fixtures of the session, lists of new members, changes of address, etc.

During the period under review the loss of income through the remission of subscriptions of members serving with the Forces has amounted to nearly £1,100. By the exercise of the strictest economy, however, substantial saving has been effected in various items of expenditure, and after meeting all liabilities the Council are able to announce a surplus of over £400. The following table shows in round figures the sum of the principal items of income and expenditure in the year before the war and since:—

	1913. £	1914. £	1915. £	1916 £
Income	12,869	14,114	10,740	8,294
Expenditure	11,567	11,391	10,020	7,882
Surplus	1,302	*2,722	719	412
Bank overdraft	4,846	2,707	2,044	1,900
Examination fees	1,633	1,169	749	317
Examination expenses	357	353	237	84
Use of rooms and galleries and rent from tenants	392	454	85	80
Grants	534	1,148	1,501	474
Journal	2,129	1,804	1,531	1,118
General printing, etc.	1,115	944	694	449
Kalendar	350	323	333	†37
Civic Survey	—	—	28	28
War Committee	—	—	159	240
Subscriptions in arrear	776	1,063	1,169	1,946

*Increase due to final dividend from Architectural Union Company on liquidation. †Supplement only.

In the rough estimate of the probable amount of income and expenditure submitted by the Council for the year 1916, the income was computed at £8,485, and the expenditure at £8,132, leaving a probable balance of £353. The actual income was about £8,294, the expenditure about £7,882, and the balance £412. This result appears to the auditors to be quite satisfactory, especially as the computed amount to be received from subscriptions and arrears was £7,300, whereas the amount received was about £253 less than this sum, mainly caused by the well-earned remission of fees to members serving in his Majesty's Forces. The Council estimates the ordinary revenue for the present year at £7,580 and the expenditure at £7,315, leaving an estimated surplus of £165.

The Passeggiata Archeologica, inaugurated at Rome, is the first step towards the establishment of a regular monumental area, which will be handed over to the town administration. It is the intention of the Government to form within Rome a monumental city, isolating the various forums and the Capitol. This plan would mean that the whole Capitoline Hill will form part of the monumental city and the Caffarelli Palace, the seat of the German Embassy, which is placed in a conspicuous position on the Capitoline, would be taken over by the State.

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THE HORYUJI AS A MASTERPIECE OF ART.

By DR. CHUTA ITO.

The Horyuji temple is one of the oldest sacred structures in Japan, as well as one of the noblest examples of our ancient architecture. When Buddhism was introduced into Japan there was considerable difference of opinion among the great families as to the desirability of encouraging the new religion, some taking one side and some taking the other; and so there was constant strife for a time between the adherents of the old and the new, the one contending that Shinto should remain the national faith and the other wanting Buddhism as the religion of Japan. But the Heir Apparent, Prince Shotoku Taishi, stood out for Buddhism, and at last succeeded in establishing his views and the bringing about the ascendancy of the new religion. Consequently, all the great Buddhist temples were built with these ideas in view; and the Horyuji was one of the best so constructed. The Shitenno-ji at Osaka was also erected for the same purpose, and several others in various parts of the Empire. The Shitenno-ji was supposed to be the grandest of these structures, and it was not merely a temple, but a government building; and the Horyuji was erected for the purpose of special studies, a temple of learning, where Buddhist lore was the main subject.

It was finished in the 15th year of the Empress Suiko, that is in A.D. 607; and the construction was under the auspices of Prince Shotoku Taishi. The model was supposed to have been Korean. In the midst of the buildings stands the Kondo, or Golden Hall, near which is a five-storied pagoda where some relics of Buddha are preserved. Around them several fine buildings rise in united splendour. The Horyuji has stood there in all its unsullied magnificence for the last 1,300 years. To the Japanese it seems nothing less than a miracle. The style of architecture is regarded as beautiful beyond comparison. The style represents the most advanced ideas of the day, and reveals the artistic genius of the great Prince Regent.

No one can view the central building from the middle gateway, the Chumon, without being profoundly impressed by its great splendour; while the surrounding buildings simply enhance the beauty and harmony of the whole. The sizes and general proportions of the different buildings are designed to blend into one grand harmonious achievement. There is no modern structure that can thus compare with the Horyuji. The Hongwanji at Kyoto is grand; but its grandeur lies in the main building only. For beauty of symmetry and general perfection the Horyuji is supreme among sacred edifices in Japan. Perhaps this superb freedom of scope and line is due largely to the fact that the architect had nothing to imitate, and the genius of the architect was at liberty to have its way unrestrained. The fact that the middle gate had a pillar in the centre of the gateway is an instance of this fine freedom. This pillar has been a subject of discussion for centuries, but no doubt it was placed there simply for the sake of beauty—art for art's sake. Four pillars would have involved too wide a gateway; two would have made it too narrow; one was just right, or three pillars in all. The inconvenience of having a pillar in the middle of a gateway did not at all interfere with the artist's idea of the beauty of the thing. It was a trumph of beauty over utility. Every other consideration was sacrificed to art. The same principle is to be observed in other parts of the building, notably in the upper portion of the pagoda, where a third pillar gives an impression of spaciousness.

The architecture of the Horyuji is supposed to have come from China through Korea. This can be readily proved by reference to certain famous examples of Korean architecture. But whence did China derive such art? No doubt it came from India; and Indian art, in turn, was derived from Assyria and Greece. Viewed in this light the art of the Horyuji temple comprises the soul of India, Persia, Assyria, and Greece, after passing through the alembic of the Japanese mind. The Horyuji is, therefore, not only the oldest in Japan, but the most important example of ancient art in the Far East. It represents the best that the East and West could combine to produce in ancient times.

That it has been preserved through the changes and vicissitudes of 1,300 years is in itself a wonderful thing. No doubt the dryness of the Yamato atmosphere contributed to its length of days—the driest air in all Japan. The timbers of the Horyuji are mostly hinoki wood, a kind of cedar; and this wood, properly cut and dressed and seasoned, has endless durability. Hinoki buried in desert sands has been found perfectly sound after a thousand years. In the Horyuji only those timbers exposed to wind and wet have decayed. How much longer the sacred edifice will hold out against time is a question, but probably it will stand for some hundreds of years yet. The Imperial Government is taking the strictest care of the building and every sign of decay is at once attended to. The mural paintings are suffering most from the action of air and time. It is not too much to say that the Horyuji is the most important art treasure of its kind in the world to-day, and the entire nation should be concerned in its preservation.—"The Japan Magazine."

THE NATIONAL FEDERATION OF HOUSE BUILDERS.

The first meeting of the National Federation of House Builders was held in Manchester on Wednesday last, and was attended by representative builders from all parts of the country. The federation has been formed for a double purpose—first, to watch over and protect the interests of the house builder, who in the past has provided practically all the houses of the working classes; and secondly, to assist in the solution of the housing problem by expressing the united view of the house builders of the country on the question of the future housing policy.

In addition to the delegates present, many cordial letters had been received from builders in all parts, expressing regret that the travelling facilities did not permit of the writers attending the meeting.

Mr. C. H. Oldham, of Manchester, was elected president of the federation for the current year, Mr. Geo. Sadler, of Nottingham, vice-president, and Mr. R. A. Costain, of Liverpool, was elected treasurer.

Mr. Oldham, in his presidential address, said that the federation was not formed in any antagonistic spirit towards other trade organisations, but had been brought into being because there was no organisation qualified to deal with the problems of the house building trade, or with the many ramifications of the housing question, in a practical manner.

He contrasted the results of public housing schemes with the productions of the house builder, and showed that private enterprise built a better house, a larger house, and a more convenient house, at less cost than any public body. He pointed out that in the past, when legislation affecting land and house property had been contemplated, the contracting builder had been asked to advise instead of the house builder being consulted. The contracting builder, when he builds houses at all, is only interested in the operation as a contract for which he is paid a certain sum. On the other hand, the house builder buys his land, erects the houses, and finances the whole transaction, and unless he has built the right kind of house on the right site to let at the right price he cannot attract either tenants or buyers. The house builder was particularly qualified by experience to speak on the housing question; he was familiar with the demands of the people; he knew their requirements, and, more than that, he knew what rent they could afford to pay. The question of housing was an economic one, and if the people received sufficient wages to live in the decent comfort to which they were entitled there would be no difficulty in providing the houses.

The grave shortage of houses which faced the country—a position amounting to a national danger—had coincided with the agitation of a section of the political parties of the country, who sought to commit the Government to the expenditure of vast sums of money in housing, the effect of which could only be to subsidise the employer, by enabling him to obtain labour at a low rate. The practical result of all this agitation had been to discourage building by private enterprise, and thus to intensify the housing problem; in short, the agitation for State building had given a new lease of life to slum property, for it was impossible for local authorities to condemn insanitary houses when there were no other houses for the people to go to. Mr. Oldham expressed the desire of all house builders to assist in the housing of the people under better and more healthy conditions than before, and emphasised the fact that the interests of the community were also the interests of the house builder in improving the standard of the people's lives.

An influential committee was formed, and Mr. Norman McKellen, A.S.A.A., of 27, Brazenose Street, Manchester, was appointed secretary to the federation. The next meeting of the federation is to be held in Sheffield at an early date.

LEGAL INTELLIGENCE.

LONDON BUILDING ACTS: FAILURE TO GIVE NOTICE TO DISTRICT SURVEYOR.—At Tower Bridge Police Court on April 26, 1917, Messrs. Haywards, Limited, of Union Street, Borough, were summoned before Mr. Cecil Chapman at the instance of Mr. C. W. Surrey, interim district surveyor for Southwark and North Lambeth, for having fixed a sectional boiler and steam pipes and having connected the flue therefrom to an old flue at the premises of the Healy Box Co., Limited, 83, Southwark Street, S.E., without first giving notice to the district surveyor. Mr. Pasmore, of Messrs. Hicklin, Washington, and Pasmore, solicitors for the complainant, stated that the work was discovered through a complaint of smoke penetrating the party wall into the staircase of the adjoining building, and that on investigation it was found that the work done infringed several sub-sections of various sections of the Act involved. Mr. Francis, of Messrs. Francis and Veneer, solicitors for the defendant company, admitted the offence on behalf of his clients, but stated that, as the occupiers were carrying out other works at the same time, it was assumed that the necessary notice had been given by them. The magistrate imposed a fine of 20s. and £4 4s. costs.

WAR PRICES AND PAINTING "TO LET" BOARDS.—Mr. F. R. Gough, 5, Fye Foot Lane, sued Mr. Frank Hilbury, estate agent, 140, Leadenhall Street, in the City of London Court, for £1 6s. 4d. for painting "To Let" boards and fixing them. Defendant paid £1 1s. 4d. into Court, and said he disputed the balance as a question of principle. Plaintiff had been painting boards for him for twenty-five years at an agreed price, but now he charged him 33 per cent., and in some instances 100 per cent., more than before the war, without giving any notice. He was willing to pay 10 per cent. increase. Plaintiff said that, in view of the increased cost, his prices were quite reasonable. Judgment was given for the plaintiff, with costs.

The exports of timber from this country last year amounted to 6,400,000 tons.

An Order has been made by the Board of Trade under the Trading with the Enemy Amendment Act requiring the following business to be wound up:—Kroll and Company, Bayham Place, Camden Town, London, N.W., metal workers (April 26).

Mr. and Mrs. Russell, of 43, Great George Street, Rochdale, have received an official intimation that their eldest son, Sapper R. Russell, of the Royal Engineers, previously reported "missing, believed drowned," was killed in action in the Persian Gulf on March 9. Sapper Russell was thirty years of age and unmarried. He enlisted in November, 1915, previously working as a joiner for the Rochdale Market Company.

Last Wednesday evening the Todmorden Town Council decided to ask for sanction to borrow £10,000 for a new generator for the electricity works. This was agreed to after a lively debate. Councillor Brook (chairman of the Electricity Committee) declared that the existing plant was five years behind the times. The Gas Committee had been allowed to rule the whole show, but he should push the new scheme, whether it meant decreasing the gas customers or not.

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PROFESSIONAL AND TRADE SOCIETIES.

ARCHITECTURAL ASSOCIATION OF IRELAND.—The annual general meeting of the Architectural Association of Ireland took place last Thursday evening at 15, South Frederick Street, Dublin. The cutgoing president, Mr. H. G. Leask, and the incoming president, Mr. Edwin Bradbury, were successively in the chair.—Mr. Leask first announced that the officers and committee for the session 1917-1918 had been chosen by ballot as follows:—President, Edwin Bradbury; vice-president, Louis F. Giron; committee, H. Allberry, G. F. Beckett, A. E. Jones, W. S. Keatinge, H. G. Leask, H. J. Lundy, G. G. Lynes, B. O'Callagham, and L. O'Callaghan; hon. treasurer, W. G. Clayton; hon. librarian, T. L. Cullimore; hon. secretaries, W. A. Dixon and W. H. O'Donell; hon. auditors, J. H. Webb and F. G. Hicks.—Mr. Bradbury proposed that the association should adopt the report and statement of accounts. He said that the members must all agree that, considering the conditions of the last two or three years, the association had done well. He thought that this was owing to the work of the president and the other responsible officers. The attendance at the classes had not been very good; the sparsity was accounted for by the fact that one-fifth of the association's members were actually on active service. This was a record of which the association might well be proud.—Mr. Holloway seconded Mr. Bradbury, and the association adopted the report and statement of accounts.—After a distribution of prizes, Mr. Bradbury was moved to the chair.—Mr. Beckett then proposed that the association should thank Mr. Leask for his presidency.—Mr. Lyons seconded; he thought that Mr. Leask had done more than any other president of the association.—Mr. Leask acknowledged the vote. He proposed that the association should thank the retiring officers, and he was seconded therein by Mr. Keatinge.—Mr. Giron, acknowledging the association's thanks, referred to an address which had been presented to him on the previous day.

NOTTINGHAM AND DERBY ARCHITECTURAL SOCIETY.—The president, Mr. Harry Gill, M.S.A., took the chair at the fifty-fourth annual meeting on Tuesday, April 24. The council reported that one new member had been elected, and that two members and one associate have resigned. They recorded with sorrow the loss by death of three past-presidents, Messrs. W. A. Heazell, G. T. Hine, and W. D. Pratt; one honorary member, Mr. A. G. Webster; and one associate, Captain N. H. Pratt, 10th Battalion Sherwood Foresters, who fell in action. The total membership is now 110—viz., six honorary members, sixty members, and forty-four associates, a decrease of five as compared with last year. The master builders have requested the council to agree to an alteration in the conditions of contract, so that payments on account may be made at the rate of 90 per cent. instead of 80 per cent. and in addition a payment of 5 per cent. interest upon retention money. After careful consideration the council decided to refer the matter to the Practice Committee of the R.I.B.A., who suggested that the present custom of payments on account should be adhered to. The president of the master builders has since had an interview with the president of this society, when it was mutually agreed that in consequence of the conditions of trade now prevailing architects might certify to pay 90 per cent. on works in progress during the continuance of the war, this to be without prejudice to after-war conditions. The council have kept up a regular correspondence with the Architects War Committee and supported a deputation from the R.I.B.A. and the allied societies to Mr. Neville Chamberlain to request that the services of architects over military age should be utilised in the national service wherever their professional training and experience would be of value to the State. The council gave a donation of three guineas to the Architects' Benevolent Society. The society again sent to the members serving their King and country a suitable greeting last Christmas. The members of the profession were still suffering through the necessary restriction of private building. As such a large proportion of the members were on active service, and the majority of those over age were doing various kinds of war work, only one winter meeting has been held. No subscriptions had been collected from members serving with the colours, but notwithstanding the falling off in income the council were able to show a satisfactory balance in hand.—The hon. librarian, Mr. Spencer, announced that several members had again very generously given books to the library and a number of drawings, water-colours and paintings had been given to the society by the members.—A motion "That the rules as to the election of officers be suspended and the present officers continue until April, 1918," was unanimously agreed to.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—The following are the nominations of new members seeking election on June 11 next. Notice of any objection or other communication respecting them must be sent to the Secretary, R.I.B.A., 9, Conduit Street, W., for submission to the council prior to Monday, May 21:—As Fellows (five).—Benwell, John Wayland (A.), 28, Lowther Street, Carlisle; 11, Warwick Square, Carlisle. Fraser, Percival Maurice (A.), 11, New Court, Lincoln's Inn, W.C.; South Logan, Devonshire Road, Sutton, Surrey. Healey, Alfred John (A.), 71, Marlborough Mansions, Cannon Hill, Hampstead, N.W. Heathcote, Ernest Gregg (Licentiate, passed the examination qualifying for candidature as Fellow), 110, Cannon Street, E.C., and Lloyd's Bank Buildings, King Street, Manchester. Spain, Colonel Alfred, V.D. (A.), Royal Insurance Buildings, 16, Spring Street, Sydney, N.S.W. As Associates (four).—Hamilton, Andrew Blayney, "Doubank," The Terrace, Wellington, N.Z. Keeley, Cecil John Harvey, Home Affairs Department, Collins Street, Melbourne. Ridley, Captain Basil White, St. Wilfrid's, East Grinstead, Sussex. Wightman, Thomas Blair Moncrieff, Queen Street, Brisbane, Australia. As Honorary Associate.—Penneli, Joseph, hon. member American Institute of Architects, etc., 3, Adelphi Terrace House, Robert Street, Strand, W.C.

SHEFFIELD SOCIETY OF ARCHITECTS.—The annual report of the Sheffield, South Yorkshire and District Society of Architects and Surveyors for the year ending October, 1916, states that the total membership now stands as follows:—Two honorary members, thirty-five Fellows, forty-seven associates, nine students, and nine lay members; total, 102, as compared with 108 last year. During the past session there have been three ordinary meetings, five council meetings, and one meeting of each of the following committees:—Library, architectural studies, and special sub-committees respecting model by-laws and the cultivation of vacant land. There has also been a meeting of surveyor members with reference to this latter subject. Deputations have had one interview with the officials of the Local Government Board, one with the Lord Mayor and Town Clerk, and two with representatives of the Sheffield Master Builders' Association. The obituary of members includes the late Mr. Charles Hadfield and Mr. Charles Green. The finances of the society are in a healthy condition, a balance of £98 17s. 10d. remaining at the bank, as against £61 4s. 1d. in 1915.

The death is announced of Mr. William Henry James Weale, the art-historian and antiquary. Mr. Weale was born in Marylebone on March 8, 1832, and was educated at King's College, London. His first publication was an archæological guide-book to Belgium, Aix-la-Chapelle, and Cologne (1859); and by that time he was already a member of the Royal Society of Fine Arts, Ghent, and of the Archæological Society of Mons.

Mr. James Forrest, of St. Leonards-on-Sea aged 92, honorary secretary and for many years secretary of the institution of Civil Engineers, having been connected with the institution for seventy-five years, who died on March 2, left estate valued at £13,688, with net personalty £13,574. The testator left, in addition to a number of personal legacies, £500 to the institution, to be added to the "James Forrest Lecture Trust Fund."

Our Office Table.

One thousand Australian carpenters are coming to this country to assist in war work. The terms of the agrement provide that each man will be given not only a free passage to and from England, but also an expenses allowance of £5 each way. The men are to be returned to Australia as soon as possible after the war ends. Maintenance allowances for wife, mother, or other members of a carpenter's family, providing they are residing in Australia when he embarks, are to be made as follows:—For the first eight weeks after embarkation 25s. per week and 2s. 6d. a week additional for each child under sixteen years of age; thereafter 20s. a week and 2s. a wee fork each child until the bread-winner returns. The men will be required to obey instructions from the Ministry of Munitions, or any authorised representative of the Commonwealth Government, during their stay in this country, and each man will report himself immediately on his arrival. Wages and working conditions will be those prevailing in the manufactory in which he is employed.

Mr. Chatterson Smith, head master of the Birmingham School of Art, delivered an address to the Birmingham Rotary Club last week. He said we had been in many artistic directions the leading nation. We had given the impetus to all the recent arts and crafts movements in Europe and America, even to our cost, for they had taken our ideas and in many cases cheapened and even vulgarised them. No doubt, the nation had been run on utilitarian lines, but our art instincts had not been entirely submerged, and he could assure them that there was plenty of first-rate talent to be called forth, although not suddenly. The function of the School of Art was to give such talent a chance of coming forward. The School of Art Committee were endeavouring to meet the needs of the trades of the city by the establishment of a school for classes for apprentices and others to attend in the daytime. To do that the committee must have the goodwill and help of the manufacturers of the city. The supply to the city of persons who had had training in drawing and modelling, metal work, etc., had been continuous for many years, and the demand for trained students was on the increase.

At a conference last week between the Director of Materials and representatives of the National Federation of Paint, Colour, and Varnish Manufacturers' Associations of the United Kingdom it was decided to allow the sale and use without restriction as to quantity or purpose of (1) all coloured paints in paste form or dry colour affected by the Lead Order of April 5, excluding any tinted, genuine, or reduced white lead, or sulphate of lead; (2) all paste and liquid dryers containing lead; (3) all ready mixed paints containing lead—provided that any of these materials were actually manufactured on the 24th inst. It was further decided to allow the supply of white or tinted paints containing not more than 50 per cent. of white or red lead or lead sulphate based on dry material direct to ships, but not into store, on account of owners or ship store merchants up to May 31. After that date these goods must be supplied only in accordance with the Order dated April 6, 1917. The time of grace is allowed to enable shipowners and ship-store merchants to obtain the necessary priority classification, for which they should apply to the Ministry of Munitions, Priority Branch, 1, Caxton Street, Westminster. In all other respects the Order dated April 6, 1917, must be strictly adhered to.

At the December meeting the Bristol City Council gratefully accepted an offer by Mr. Melville Wills of a picture to adorn one of the panels of the walls of the Council Chamber, the subject being "The State Entry of Queen Elizabeth into Bristol, August 14, 1574." The hope was expressed that Mr. Wills's gift would form the first of a series, and at the last council meeting the Lord Mayor reported offers of further pictures on historic subjects from Mr. Foster Robinson, Mr. E. W. Savory, and Mr. Edward Robinson. This brought the number up to four, and Mr. T. J. Lennard offered to provide a fifth, so that a very good

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start has been made with the scheme. There are nine panels in the Council Chamber, but, as Mr. Savory explained, it is hoped to secure eighteen pictures, because the stipulation is being made that the works shall be exhibited for a certain period in each year at the Art Gallery. Thanks were voted to the donors, and the care of the historical pictures is to be vested in the vice-chairman of the Estates and General Purposes Committee, the chairman of the Museum and Art Gallery Committee, and Mr. Savory, who is the chairman of the Royal West of England Academy.

At a general assembly of Academicians and Associates held last Thursday, Sir Ernest George, A.R.A., architect, was elected a Royal Academician, and Mr. S. Melton Fisher, painter, was elected an Associate of the Royal Academy. Sir Ernest George, who was born in 1839, studied at the Royal Academy Schools, and won the Gold Medal for Architecture in 1859, and in 1896 the Queen's Gold Medal of the Royal Institute of British Architects, of which body he was President in 1908-1909. His architectural work is well known, and as an etcher he has published plates of the Moselle, the Loire, Belgium, and Venice. He was elected an Associate of the Academy in 1910, and Knighted in the following year. Mr. Melton Fisher, born in London in 1860, studied at Lambeth School of Art, the Royal Academy, and in France. He won the Academy Gold Medal and Travelling Scholarship in 1881, afterwards settling in Italy for ten or eleven years, painting mainly Venetian subjects, which were very popular. In recent years he has devoted himself to portraiture.

Mr. Paul Waterhouse, lecturing at a general meeting of the London Society last Friday—Lord Burnham presiding—on "London After the War," said that London must change, but he hoped it would be done on reasonable lines. He objected to piecemeal alterations. On the road problem he suggested that widening was a remedy not always worth its cost. He was opposed to a great central station in London, and thought that the space devoted to Charing Cross, Cannon Street, and Holborn Viaduct Stations could be better used. The great difficulty about a big station was its size. He thought that the best way would be for all the railways to set down their passengers on the edge of a circle and hence distribute them by means of underground railways. He urged a censorship of design. London was always being patched by the charwomen. (Applause.) Mr. John Burns, M.P., commended Mr. Waterhouse's prevision. He objected to the abomination of a central station for London. He approved of the idea of a circular road to relieve traffic. It would enable them to get rid of many nuisances, including Charing Cross Bridge.

Reporting upon the activities at the Guildhall Art Gallery in 1916, Mr. A. G. Temple, F.S.A. (the Director), says that the gallery was open to the public on 299 days, and was visited by 72,235 people. During the year the Corporation became possessed of the following additional works:—Oil-painting, "The Betrothed," by J. W. Godward, from the collection of the late Mr. H. L. Florence; oil-painting, "A Canal in Belgium," by Maurice Levis (Florence collection); oil-painting, "The Market Place, Granada," by B. Galofre (Florence collection); water-colour, "Crosby Hall in Bygone Times," by J. Davies, presented by Mrs. Mabel Rees.

Apparently there will be no autumn exhibition at the Walker Art Gallery this year. Another effort was made at the meeting of the Library, Museum, and Arts Committee last Friday to secure sanction, but, like the previous endeavours in the same direction, it was futile. A resolution in favour of holding an exhibition on the lines of the motion of Mr. John Glynn in the City Council was negatived by seven votes to two.

Mr. C. A. Daubney, district surveyor of Bermondsey, has obtained an order nisi against the council to show cause why a mandamus should not issue requiring the London County Council to furnish the district surveyor with particulars of its requirements under the London Building Acts (Amendment) Act, 1905, in respect of the factory of Messrs. Gray and Sons, Foxton Street, Bermondsey. The Education Committee has dealt with these premises under the Factory and Workshop Act, 1901, and is advised that the case comes within the exceptions of Section 26 of the Act of 1905, and that no action on the part of the council or the district surveyor is therefore necessary under the latter Act. The committee has given instruction to the solicitor to defend the council's interests.

The London County Council has extended for another year the period of office of the undermentioned district surveyors who have passed the retiring age limit:—Mr. A. Ashbridge (district of St. Marylebone) and Mr. T. E. Mundy (district of Chelsea). It has appointed Mr. O. C. Hills, district surveyor for the district of the Strand, to act during the pleasure of the council as interim district surveyor of St. Margaret, etc., Westminster, in place of Mr. P. J. Elton. Mr. Elton is now on war service, but he had, since June 1, 1916, been acting as interim district surveyor for this district. Mr. Elton is also district surveyor for the district of Putney and Roehampton, and it has approved the appointment of Mr. R. Elsey Smith as deputy district surveyor for this district during Mr. Elton's absence. It has approved, under Section 141 of the London Building Act, 1894, the situation of district surveyors' offices in the undermentioned cases:—District of City of London, East, No. 223, Bishopsgate; district of Kensington, South, No. 268, Earl's Court Road; district of Bethnal Green, West, No. 130, Whitechapel High Street; district of St. Margaret, etc., Westminster, No. 60, Haymarket. The City Corporation or the metropolitan borough council concerned has in each case been notified in accordance with the provisions of the section. It has consented, under Section 142 of the London Building Act, 1894, to the appointment of deputy district surveyors in four cases.

Mr. Ballardie, city architect, Calcutta Corporation, has been granted one month's privilege leave on full pay for attending to military duties with the Port Defence Volunteers at Chingrikhal.

We regret to record that Lieutenant Crugar Stanley Peach, West Yorkshire Regiment and Royal Flying Corps, only son of Captain and Mrs. C. Stanley Peach, of Queensmead, Farnborough, Hants, aged 20, was accidentally killed on the 24th ult.

The West London Division of the St. John Ambulance Association is building at Acton Vale, on the outskirts of Acton Park, a hospital to deal with accidents on the main Uxbridge Road. The hospital will be manned day and night by voluntary workers.

Mme. Jovanovitch, wife of the Serbian Minister, opened an exhibition of Serbian handicrafts at 64, New Bond Street, W., yesterday. Examples are shown of native embroideries, handweaving, pottery, and Opanki, made by Serbian refugees in the workshops of the Serbian Relief Fund in Corsica. The exhibition remains open on Wednesday and Thursday (10 a.m. to 6 p.m. daily), and admission will be free.

News of the sudden death from apoplexy, on March 5, of Mr. Arthur Shaw Butterworth, A.M.I.C.E., municipal engineer, of Port Elizabeth, South Africa, has been received. Mr. Butterworth, who was a native of Rochdale, 44 years of age, took up his appointment at Port Elizabeth in 1902, going out from Hythe, Kent, where he had been borough engineer and surveyor. He has left a widow and two children.

An artificial stone, patented recently by E. Imer-Schneider, 8, Boulevard James Fazy, Geneva, Switzerland, is a mixture of cement, asbestos, and vegetable fibre, such as sulphite wood pulp or cotton, which has been previously treated with a cold solution of alkali, is used for making slabs, etc. In an example, the mixture consists of cement 100 parts, water 300-600 parts, asbestos 1-3 parts, and vegetable fibres 2-3 parts.

Mr. Thomas Wharrie, J.P., of 10, Eton Avenue, Hampstead, N.W., Sachel Court, Alford, Billinghurst, Sussex, and Warnham Lodge, near Horsham, a director of the British Mutual Banking Co., Ltd., and the Prudential Assurance Co., formerly head of Messrs Wharrie and Colledge, civil engineers and land surveyors, 109, Bath Street, Glasgow, who died on January 16, has left a fortune of the value of £294,852, the net personalty being £241,748.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

Telegrams: "Timeserver, Estrand, London."
Telephone: Gerrard 1291.

RECEIVED.—L. and Co.—A. D. D. and Son—J. C. S.—R. W. C.—M. and Sons—H. and G.—J. L. M.—C. H. P., Ltd.—B. and Co., Ltd.—I. C. S.—P. B. and P.

J. R. S.—Yes.

C. E.—Please send.

F. E. B.—Regretfully declined.

ENQUIRER.—Their condition is, we fear, precarious.

R T. E.—Tell your retail newsagent that, under the circumstances, we will see that his complaint is removed at once. He is being dealt with unfairly. If he does not care to do this, send your subscription direct to us, and we will send the paper direct to you and pay the postage weekly.

N. G.—Your little joke is rather far-fetched. What the museum attendant said to the lady who complained that his cases included no skull of Oliver Cromwell, whereas "they had one at Oxford," was, "Yes, madam, but this was his skull when he was a boy!" The two busts we mentioned were not of such different ages.

BUILDER.—This will clean your stone front:—Mix chloride of lime into a thick paste with water, and add one-fourth part of washing soda crushed to a powder. Apply it on the stonework with an old fibre brush, allow it to remain upon the surface of the stone for about two days, then rinse down with a copious supply of cold water.

TRADE NOTES.

The Val de Travers Asphalte Paving Co., Ltd., have just been awarded the contract to take up the wood paving in carriageway of Eccleston Street, Westminster, and lay their rock asphalte.

Boyle's latest patent "Air-Pump" Ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, have been employed at the National Physical Laboratory, Teddington.

There are undoubtedly many engineers, architects, and builders who have friends in France, Spain, Holland, Russia, Poland, Portugal, and Japan. Literature upon "Waterproofed Cement" has been translated into these seven languages, and we are asked to state that it will be sent free on request to anyone who will write to Messrs. Kerner-Greenwood and Co., Ann's Square, King's Lynn, the proprietors of the cement waterproofer "Pudlo."

The Hemsworth R.D.C. have approved plans for a new church in Mill Lane, South Kirkby, for the Rev. A. H. Walker.

The L.C.C. have notified St. Pancras Council of their refusal to allow the owner of 13, Argyle Street, W.C. 1, to re-number the house "12a."

The Rochdale Assessment Committee have this week increased the salary of their valuer, Mr. F. Cockerill, by £50 a year. His salary is now £250.

At the Metropolitan Water Board meeting last Friday it was stated that Dr. Houston, the water examination director, had given advice on a new artesian well at Sandringham, and had since been received in audience by the King at Buckingham Palace and thanked for the work he had undertaken.

London's numerous street hawkers, who seem to be able to stand every sort of weather, ought to be employed on the land, says Mr. Mead, the Marlborough Street magistrate, and very rightly. Not a few are quite young and able enough to be conscripted, but their preference for a lazy life seems tolerated.

The bust of the late Earl Kitchener by Mr. Richard Belt, presented by the sculptor to the Lord Kitchener National Memorial Fund, is now in his studio in London. It has been cast by the famous founder, Barbedienne, of Paris. The bust will stand on a pedestal cut from an oak raised from the bed of the River Moksha, in Russia.

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OUR ILLUSTRATIONS.

The Union Jack Club, Waterloo Bridge Road, London, S.E. New extensions, elevation and plans. Mr. Walter Cave, F.R.I.B.A., Architect.

Trinity Manor, Jersey, erected for Mr. Athelstan Riley. Mr. Reginald Blomfield, R.A., Architect.

Ardenrun Place, Blindley Heath, Godstone, Surrey. The Garden Front. Mr. Ernest Newton, A.R.A., P.R.I.B.A., Architect.

Lord Wandsworth Institution, Long Sutton, Hants. House for Boys, with Master and Matron's Quarters. View of front and detail sketch of entrance centre-piece. Mr. E. Guy Dawber, F.R.I.B.A., Architect.

Currente Calamo.

The American Institute of Architects, having, through its president, offered the services of the architects of America to the President of the United States, is about to classify the knowledge and special abilities of its members and other architects in a manner that will render it able in the shortest possible time to place these men where they can render their best service with no lost motion. It has, therefore, sent out a business-like schedule of age, fitness, and qualifications, which every architect is asked to fill up and return at once. Every citizen of military age is, of course, under the Constitution of the United States, subject to the call of arms. Most architects, owing to their professional training, can be of greater service than the usual enlisted man. Anyone feeling himself disqualified for service by reason of age, physical disability, or disinclination, should nevertheless sign and return the blank, thereby saving the committee the work and expense of follow-up letters. We have little doubt that the offer will be responded to by the American Government in a more adequate fashion than was vouchsafed by our own War Office to that made here.

The law as to real property or land and the law as to personal property or goods are really two quite different laws, and they do not mix well. Innocent folk who think law is law, even if it is not always justice, may be startled if they read the report and see the result of the recent case of "Marten v. Whale" in the Court of Appeal. It is a pretty, simple little story. One Thacker had a plot of land for which he wanted £350, while Marten owned a motor-car worth £300. They wished to do a swop, with a little cheque to balance things. An agreement was drawn up by which Thacker sold his bit of land to Marten, and Marten sold his motor-car to Thacker, at these figures. It was all fairly written out and signed, and looked all right. Then the land owner got the motor-car "on loan" to show it round, agreeing to return it on demand. In a thoughtless moment he sold it to a Mrs. Whale, as the lady fancied it. Thacker hearing of this, demanded its return, and then sued the lady for his car, for which he had got nothing. But the law does not work out like that. The Sale of Goods Act, 1893, provides that where a person has agreed to buy goods, such as a motor-car, and has obtained possession with the owner's consent he can sell to a third person, who buys, in good faith for value, and without notice of the owner's rights. So the plaintiff lost his case and his motor-car before he got the land, the judgment of the Court below being confirmed, fully and learnedly by the Court of Appeal, with all costs. But, of course, he can go on to get his plot of land by other proceedings under the law of real property. At the end of the first round the position is, apparently, that one man still holds his land and pockets the proceeds of the motor-car, while the other has to pay costs incurred and bring another action on the same contract with nothing in hand. It is an eminently sporting case; but the odds are hard to reckon by anyone unversed in our venerable laws who wishes to back the final winner.

We have read with considerable interest a practical address given by Mr. R. Rowland Hughes, F.A.I., to the Prenton Literary Society, Birkenhead, on "Housing and Town Planning," which has been published in pamphlet form by the society. Mr. Hughes points out how difficult it seems for Parliament to render even a good piece of legislation entirely efficacious, as instanced by the original Housing Act of 1890, and emphasises the imminence of the crisis which confronts us to-day in the grim shape of the house famine due to the fact that the second largest industry in the country is on the verge of extinction, thanks to the land clauses in Mr. Lloyd George's Finance Act of 1909-10, and the partial and bad administration of the Town Planning Act. The remedies he summarises under the heads of State housing, grants and loans to local authorities in aid of building, and the resuscitation of private enterprise, by the introduction of changes and conditions that may render it once more a commercial possibility. The first he dismisses as sheer waste of money, and all who watched the experiments in New Zealand and Ireland will agree with him. The second, as he points out, has proved, and can only prove, a partial and very uncertain remedy. The one way out of the present *impasse* is the re-establishment of private enterprise, first by the repeal of the Land Tax clauses of the Finance Act of 1909-10, the establishment of "District Building Boards," with power to finance builders' and others' schemes for artisans' dwellings by Government mortgages up to two-thirds or three-fourths of the value of the houses, and the extension of the period of loans to local authorities for road-making. These are really practical suggestions. We have offered them before, and we entirely endorse Mr. Hughes's reasons for their advocacy. There is nothing in them that conflicts with common sense, and their prompt application would set every builder busy and delight the hundreds of thousands who are homeless.

The second part of Mr. Hughes's address deals ably with the Town Planning Act, and stagnation which has hindered its adoption. "Town Planning in Compartments," as he very justly calls the present slipshod fashion in which the Act is being administered, is indeed a dismal failure. In his opinion, and ours, town planning ought to be taken out of the hands of local authorities altogether and vested in Town Planning Boards administering larger areas, without regard to existing boundaries of sundry local authorities. These Town Planning Boards should be required to complete their schemes within a period of, say, three years from the time of their appointment, and the constitution of the Boards should not only be representative of the various local authorities within the area administered, but should also include representatives from the Royal Institute of British Architects and the kindred Engineers' societies, the British Medical Association, the Master Builders' Association, the Chambers of Commerce, Estate Agents' Institute, and the Labour organisations, so that all views and interests might be embraced. Mr. Hughes gives several instances where the present pettifogging procedure of the local authorities is burking town planning. There is Birkenhead, for instance, with an area of about 4,000 acres, and up to the present it has taken power to town-plan 166! There are others, equally as

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ridiculous, of which we hear nothing from the amiable enthusiasts who treat us to rosy dreams of the "progress" they tell us we are making, and chant the praises of "model schemes" such as that at East Birmingham, which Mr. Fowler has riddled through and through in our own pages. Let us get the Town Planning Act out of these people's hands and those of the local know-nothings and give it a chance under better administration, and with it some chance of getting better arterial roads under the administration of a Central Road Board, instead of that of the present obstructives. We heartily wish the reprint of Mr. Hughes's excellent address the widest possible circulation.

The ninety-first annual exhibition of the Royal Scottish Academy, which opened at Edinburgh last Saturday is a fairly good one. There are three very good portraits by the President, Sir James Guthrie, and one by Mr. David Alison of Mrs. Laura MacKinnon. Mr. Fiddes Watts has also one of the Earl of Crawford. Mr. Robert Gibb's "Communion at the Front" will touch deeply the hearts of all Scotsmen. "Somewhere in France" are gathered together round the white-covered communion table in one of the huts Scottish soldiers of many units engaged in the simple but impressive celebration of the sacrament according to the Presbyterian rite. If ever, since its first institution, self-sacrifice has been the pervading inspiration of the participants of the great feast, it will be found in this picture. Among other notable works those by Mr. Lawton Wingate, Mr. Houston, Mr. Roche, Mr. Campbell Mitchell, Mr. Robert Noble, Mr. John H. Lorimer, Mr. James Paterson, Mr. Robert Home, Mr. P. W. Adam, and Mr. F. C. Cadell, will not disappoint their many admirers. A good many of last year's Royal Academy pictures have found their way to Edinburgh, notably Mr. Frank Brangwyn's "Poulterer's Shop," and there are others by Mr. C H. Shannon, Mr. Orpen, Mr. James Quinn, Mr. Sargent, Mr. John Lavery, and Mr. George Clausen. There is a good collection of water-colours arranged by Mr. Brangwyn, and some representative drawings in the black-and-white room by Mr. Sargent, Mr. Muirhead Bone, Sir W. Q. Orchardson, and others.

The report of the New South Wales Department of Public Works, of which Mr. J. Davis, M.I.C.E., is the Director-General, is a business-like record of the work during the year ending June 30, 1916. The frontispiece is a "Roll of Duty," exhibiting the names of the officers of the Department who have joined the Forces, including 546 names—a creditable record of the loyalty and patriotism which is deservedly emblazoned in a manner worthy of imitation this side, instead of the mere list of names generally given. The Roll is tastefully produced, and will be preserved in many a family the members of which have given their lives for King and Empire. The gross expenditure of the Department during the year was £3,828,647 14s. 3d., and the number of pay vouchers of all descriptions 56,416. In 1906-7 the figures were £1,920,480 6s. 2d. and 56,416. The work covers all public works, which are carried out under a contract with and by Messrs. Norton Griffiths and Co., but under the supervision and from the plans and specifications of the Department, as is also the railway and tramway construction. Harbour work, drainage, water supply, and sewage bulk largely in the total. The total expenditure on public buildings amounted to £383,608 7s.

The last (April) issue of the informative pamphlets issued by the British Reinforced Concrete Engineering Company, Ltd., of 1, Dickinson Street, Manchester, has a well-timed and readable article entitled "Fitting the Vehicle to the Road," in which it is pointed out that the cries of our own days for the banishment of traction engine and other heavy traffic, and the confining all motors to special tracks, are only echoes of old grumbles by people who objected to all innovations, and thought soft roads were the acme of perfection, and that "public nuisances," as James the First styled four-wheeled waggons, then just introduced, should be banished or heavily handicapped with fines and restrictions. Another craze of our forefathers was that the fewer the horses used to draw the waggon the less the road would suffer; the result being that farmers and traders loaded their vehicles to breaking-down point, and the horses straining to the utmost, under the whip, dug their feet into the ground and did much more damage to the roads than a larger team would have done. Then followed the delusion that all wheels must have broad tires, and total remissions of tolls were offered to all vehicles fitted with such, till some as much as 16 ins. or 19 ins. were commonly to be seen. About the "advantages" thereof there was any amount of legislation and theorising by cranks, apparently under the idea that every man was to be his own road-roller. One genius, indeed—Daniel Bourne—designed a waggon which he insisted would improve any road it travelled over. The illustration given reveals short rollers under the waggon instead of wheels, the four together rolling out a track five feet wide. It was not till we were well into the nineteenth century that people found out it paid best to suit the roads to the traffic, and not to limit the traffic to the capabilities of the roads. Possibly it will not be till a few hundreds of the cranks among us are dead and buried that the advantages of good roads will be fully recognised, meeting modern needs, at reasonable cost, thanks to such a system as that proved so successful and provided by the road-reinforcement method of the British Reinforced Concrete Engineering Company.

The Board of Trade has made an order under the Trading with the Enemy Amendment Act requiring the following business to be wound up:—The London Emery Works Company, Limited, Park, Tottenham, London, N., manufacturers of emery paper (May 1).

ARCHITECTURE AT THE ROYAL ACADEMY.

On first entering the Architectural Gallery an agreeable surprise awaits those who, perhaps not unreasonably, anticipated that the admittance this year of so many photographs of permiscuous buildings, large and small, might produce the effect familiar enough in an auctioneer's show-room, surrounded by a lot of views of various marketable properties. This result has, however, been obviated by ingeniously intermingling water-colour sketches, pen and ink perspectives, and a few large-scale details. It also must be admitted that the grouping of the photographs has, on the whole, been well managed, though a good deal of space has been wasted, and room on the walls is left bare without reason. The assemblage is wanting in interest, and this is largely due to the considerable proportion of the buildings exhibited having been carried out long since, and some even anterior to the last decade. Thus there is an absence of freshness and an out-of-date look in no small degree due to the ruthless depletion which took place straightaway after Easter. What determined the choice actually made we cannot conceive, and were it not for the names of some of the authors of rejected contributions, an impression would have been unavoidable that a few well-known architects had been unduly accorded a preference.

By far the largest amount of space on the north wall is occupied by three enormous frames giving geometrical drawings and a site plan of the proposed scheme for the improvement of the city of Bath by Mr. Robert Atkinson. This capable piece of town planning and street design on ideal lines is properly placed on its merits, though the proposal has been exhibited freely before in the same gallery. All agree that its author has prepared a very clever and monumental solution of the problem, but whether alterations of so vast a scale are ever likely to be realised seems doubtful, at any rate, for many years, considering the conditions likely to prevail after the war. These vast strainers may not be too big for the subject represented, but the three of them overtop the best part of the north side wall, to the manifest disadvantage of works in their immediate vicinity. Just below, for instance, fixed partly on the skirting, is a small frame, not many inches high, of a very refined green marble escutcheon erected in Lowther Castle chapel by Mr. George H. Wenyon (1329) in memory of Sir Gerard Augustus Lowther, Bart., with heraldic bearings, delicately introduced with mantlings at the top. This is the only exhibit of its kind, and with its little lettering it cannot be properly seen without going down on one's knees and hands on the floor. If worth showing at all, such a subject ought to be level with the eye. In the middle of the east wall Sir Gilbert Scott's design for St. Mary's Cathedral, Edinburgh, won in limited competition in the early seventies, has the well-deserved post of honour (1346). We illustrated this fine water-colour, drawn by Mr. Charles Gascoyne, in our issue of January 2, 1914, when the western towers had been completed under the direction of the late John Oldrid Scott, assisted by his son, Mr. C. M. O. Scott, who very properly has sent the picture, which has more than a passing interest, redeeming, as it does, much of the paucity of contemporary church architecture now prevalent. In a similar situation at the west end of the gallery are two photo-

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graphic enlargements of the University College of North Wales, at Bangor, built some time since by Mr. Henry T. Hare, the president-elect of the Royal Institute of British Architects (1446-1447). The exterior, seen prominently commanding the skyline on its eminent site, as visible from the railway, is quite the most effective building shown in the gallery, with its masterly tower and excellent treatment in that particular type of modern developed Renaissance which this architect so distinctly made his own. The interior of the Senate room is distinguished by a rich arched ceiling pleasingly enriched in plaster foliations and springing quite unpretentiously above the quietly wainscoted walls. It is a matter of regret that Mr. Hare should have departed in his more recent designs from this manner by which he made his reputation years ago.

The south wall of the gallery contains most of the work shown on this occasion by members of the Academy, and among these Mr. E. L. Lutyens easily takes the lead with a pair of uncommonly clever water-colour studies of his design for a big mansion, El Gaudalperal, Spain (1394-1408), drawn by Mr. W. Walcot with dashing dexterity and very little detail. The plan shows the scope of this palatial scheme which is handled in strict conformity with Spanish Renaissance of the most pleasing and broadly conceived period with stucco wall surfaces and big red Spanish tiles over the wide-spreading eaves, which cast a deep shadow from the vertical sun. The doorways and fenestration, set in broad mural dispositions, have very freely rich pedimented heads, grilles, of course, and side trimmings. The cloister round the internal quad adds naturally very much to the interest of the planning, which includes a private chapel and other becoming accessories to so important a residence, where money is not lacking to ensure a splendid result. "Heathcote," Ilkley, in the Yorkshire Wolds, is a home in another climate and differing material; but Mr. Lutyens shows how he understands the altered conditions and purposes of his work (1379-1380). Two good photographs, taken a while since, represent a small part of the staircase hall, all in stone, and the south-east corner of the garden front, of which we gave a view in the autumn of 1909. The morning room of this same house is represented by 1421, on the same wall, the treatment being in Mr. Lutyens's best English manner, with an escritoire treated as a fitment, also cupboards on the other hand of the marble fireplace to match, and pane-glazed bookcases above. The bird's-eye (1461) of the British School of Architecture, Valle Giulia, Rome, is the remaining work exhibited this year by Mr. Lutyens, and for classic directness and able scale in this comparatively small institution in such environments the architect here well displays his taste and universality in practice. We illustrated the elevation and plan of the original scheme, March 24, 1911.

Sir Aston Webb, R.A., avails himself of the change, which he did so much to accomplish, by which photographs have been admitted by the Royal Academy, and has sent four frames of sun pictures and only one drawing. This (1416) illustrates a work of addition and alterations to 35, Porchester Terrace, W., and a pair of plans give an idea as to how the central two rooms, necessarily retained, somewhat hamper the disposition of the building and bisect the arrangements, which include on the right hand a capital ground staircase hall reached by a corridor from the porch entered directly off the street, with a garden room of long proportions alongside. The exterior is finished in cement, which is a shortcoming as far as architectural expression goes, but no alternative was available. The garden front is marked by two bays, one at each extremity, and rising through two floors; the central bay, forming the terrace approach, appears to have belonged to the original premises. The plans being all blacked in, it is not easy to understand which is old or new. The attic rising over the middle of the building has a hipped roof, and the absence of a balustrade to the main walls spares it from the commonplace of that peculiar type of suburban domestic work so familiar in the older parts of modern London, built when cement rendering came into vogue. Sir Aston Webb's great works at South Kensington are represented by the photographs here on view and are too familiar to need particular description: No. 1453, Main Entrance Imperial College of Science and Technology; No. 1455, Goldsmiths extension of the City and Guilds Engineering College, Prince Consort Road; and No. 1474, the Victoria and Albert Museum Main Entrance and Central Tower. The remaining photograph, No. 1348, is of the College Chapel, Worksop, which is unusually lofty; but this view, by being broad, cuts off the archway to the quasi-chancel or sanctuary, and alters the proportions, also makes too much of the wall panellings over the chapel seatings. The altar wants elevating considerably, and being so low down is wanting in dignity. The Chapels to Lancing and Hurstpierpoint Colleges show the good effect of an elevated sacrarium architecturally considered.

Mr. Reginald Blomfield, R.A., sends an enlarged photograph, of which we give a reproduction to-day, of Mr. Athelstan Riley's house, La Trinité, Jersey (1413), built some years ago in granite, the lower part of the main body of the premises including the old building on the site. Its lofty roof gives the mansion much distinction and individuality of character. Mr. Blomfield's new work is shown by an autograph pencil perspective (1433), setting out a range of new classrooms and a gate-house of the Universities type, on one side of a proposed quadrangle for Sherborne School. The design is extremely quiet, handled in an Academic rendering of simple Tudor—not very inspiring perhaps, if in character with old Dorsetshire stonework of the vernacular order. Sherborne is such a picturesque old-world place, that additions need be gravely undertaken and with decorum. Lincoln also is famous in history, and No. 1439, Mr. Blomfield's third exhibit shows the public library built a few years ago in that city. The centre-piece has a lead-covered cupola, and the windows have square-headed sashes. The ashlar-faced walling is relieved by a frieze interspaced between the fenestration, and hanging draperies, with circular discs, are distinguishing ornaments to the elevation, which, judging by this photograph, is in a side street on a slope.

Sir Ernest George, R.A., relies this year on two representative and charming water-colours (804) the first, a spacious picture overlooking Rouen and the Seine, and the other, called "Black Angers" (922), in which the bastioned citadel figures in all its ancient dignity, with the bridge approach in the forefront of the sketch. The Royal Academy of Music, in the Marylebone Road, so well known to Londoners (1466), is the sole exemplar in the architectural gallery shown on this occasion by Messrs. Ernest George and Alfred Yeates. We illustrated this handsome Renaissance pile in our issue for May 19, 1911. In the previous Academy the exterior found a place.

The president of the Institute, Mr. Ernest Newton, R.A., has three frames of photographs of houses erected at various times, viz., (1376) "Luckley," Wokingham, Ardenrun Place, Blindley Heath (1383), of which we give the garden front to-day, and Upton Grey Manor (1391), by a frame including four pictures very cleverly arranged so that the perspective lines do not interfere with each other as often happens, as in the pair of interiors of the old-world type of house at Sherborne (1369), by Mr. Baillie Scott, hanging near on the same wall. The heavy ceiling timbers appear in the photographs to clash and mar the composition.

Sir Thomas G. Jackson, Bart., R.A., does not exhibit at all, but Mr. Edward S. Prior, A.R.A., acting in concert with Mr. Henry Wilson, is represented by a masterly sketch, quarter-scale, model of the Baldachin, or Cioerium, to be placed in the Duke of Norfolk's R.C. Cathedral Church at Norwich, built by the late Mr. G. Gilbert Scott. This will be carried out in Derbyshire marbles and alabaster. The signs of the zodiac appear on the frieze modelled by Mr. Wilson, and marble dark shafts at the corners without caps or bases. The roof is domical in form, and is to have a Mosaic soffit, the style being Byzantine in manner, though the church is in the English pointed style, with columns corresponding in size to those at Tewkesbury Abbey.

Mr. E. Guy Dawber sends one frame of pastel-tinted pen and ink views of the school house (1435), which we illustrate to-day, erected in connection with the Lord Wandsworth Institution, Long Sutton, Hants. The excellence of his work needs no praise, being self-evident. The subject hangs below Mr. Blomfield's Sherborne School, already named, on the canted slope at the angle to the south wall. In a like situation towards the north we noticed a capital example of Georgian design by Messrs. Everard, Son, and Pick, of Leicester, to be carried out for the Leicestershire County Council in pale red and brindled brick dressed with stone (1460).

Mr. Sydney Greenslade shows a working detail of the National Library for Wales, Aberystwyth (1307) which we published in our series of this same building last year, and some photographs showing the structure on its unfinished site (1308) follow, but they do not exhibit the design to the best advantage. Mr. Paul Waterhouse has two works, the chief being his Prudential Buildings, Leicester, in a severe Roman classic façade. The drawing (1323) is of a study for a provincial office with a big pediment. The central dual hall of the Manchester Exchange (1311), the result of a competition a few years ago and now being built, is by Messrs. Bradshaw Gass and Hope. Mr. Walter Brierley has a house at Sittingbourne, this drawing (1440) having appeared in our pages two years ago. The same clever architect sends his Bank at Newcastle (1321) and the dining-room photograph, Normanby Park, Lincoln, all, of course, very good and homelike. The Sculpture and China Hall of the Art Gallery, Hulme, Lady Lever Memorial (1322) by Messrs. W. and Segar Owen, is classical and Doric in fashion, a colonnade circular on plan with domical light over gracefully drawn and tinted in chalks by Mr. Raffles Davison. We shall illustrate this in due course, and also we shall

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give the King Edward VII. Art School, Armstrong College, Newcastle-on-Tyne, an excellent and important work by Mr. William H. Knowles, F.S.A. (1325). The Charing Cross Bridge scheme by Messrs. T. R. Davison and D. B. Niven (1324 and 1326) is handsomely shown by a pair of graphic perspectives, one called "Charing Cross to Baghdad." "The Founders' Tomb," Washington Cathedral, is an addition of a rich kind to the late G. F. Bodley's church, which we have fully illustrated. The present water-colour drawing (1332) will also appear very shortly. Mr. Arthur Young's church at Bexhill has a Sussex character and is very suitable, so is his Lychgate (1342). The two rich interiors on the line by Mr. G. H. Fellowes Prynne show an elaborate bronze screen at Christ Church, Epsom (1343), and another rood screen at St. Columb's Church, Cornwall (1353), restored carefully and having a fine figure on the cross broadly dignified, as it should be. The pair of altar-pieces by Mr. Cecil G. Hare, Yoxall Church, Staffs (1352) and Esclusham Church, Wrexham (1352) are shown by working drawings of very appropriate detail. We are to illustrate both soon, and likewise the photographs of the renovated President's Lodge Buildings at Cambridge for Queen's College (1420) in half timber, quaint and pretty, so feelingly restored by the same architect. Mr. Temple Moore is strong this year with his photographs of St. Peter's Church, Barnsley (1356-6), and St. Wilfred Church, Harrogate (1360), of which four views are shown. We shall publish these at an early date. Mr. Samuel Weatherby in 1361 has a capital screen surmounted by a rood and rich-covered and groined ceiling to the gallery for St. Stephen's Church, Norbury. The Whiteley Homes, by Mr. Mervyn Macartney, which we have already illustrated, are here scarcely done justice to by some three photographs (1377). Mr. Philip Tilden sends a sympathetic line drawing for a refined house in the style of Sir Christopher Wren as at Hampton Court (1386). Mr. Sydney Tatchell is the architect of a well-arranged house, called "Wallingford," at Purley (1392), and Messrs. Romaine, Walker and Jenkins show a series of fine photographs of handsome work at Buckland, Berks, Chatsworth, Derbyshire, and Knowsley Hall, where they built a staircase, hall and central front, all their work being well in harmony with these mansions to which these additions have been made. Messrs. Asheley and Newman are represented by their well-known Council House at Birmingham (1472), of which we have given several illustrations, and their other photographs show a house in Hampstead Lane (1401), East Finchley, a work of much skill. Messrs. Alfred Hart and Leslie Waterhouse have quite one of the best water-colours in this gallery, "Redcote," Haslemere (1412), their second work shown being "House in Wiltshire" (1431), both in excellent taste. Mr. Walter Cave is to be congratulated on the freshness of the new façade and additions to the Union Jack Club, Waterloo Road (1449), which we reproduce as a double page to-day. The problem was by no means an easy one, hampered by existing premises, and therefore the result is all the more interesting. This architect's other exhibit is a photograph of a house carried out some while ago in Northants (1375), called Littlecourt. The big detail shown by Mr. Frank Verity (1432) shows the colonnade to the Electric Pavilion, Oxford Street, to large scale, and his view by Mr. Walcot illustrates the important block of flats now erecting at the top of Park Lane, near the Marble Arch (1442). We gave a similar drawing some while back of this same project which has since been enlarged somewhat. The Marylebone Town Hall, by Mr. Edwin Cooper (1445-1450), is quite one of the best recently erected public buildings in the Metropolis, and it has been much improved, particularly in the proportions of its handsome colonnade, since the competition design was accepted. We have illustrated it before, and hope to give these new photographs shortly. The Cunard Building, Liverpool, interiors by Messrs. Willink and Thicknesse (1471 and 1477), are worthy of this great shipping centre, and are realised in a cultivated classic way, practical and architectural. No. 93, Mortimer Street, W., is relatively small (1451), by Messrs. W. and E. Hunt, who have handled their façade in a similarly dignified manner without fussy detail. We illustrated this building in 1912. Messrs. Percy Adams and L. H. Holden are about to greatly enlarge St. George's Hospital, and they exhibit the Knightsbridge façade (1437) by an elevation which we shall publish in a week or two. It is very simple and suitable; also in harmony with the stabilty of the old structure. The extensions are urgently needed in this time of stress. The Boys' Garden City, Woodford, by Mr. W. A. Pite, is a small but excellent piece of institutional work (1418), and we shall give this drawing before long. Capt. Maurice E. Webb sends a nice garden house at Foxbury, Chislehurst, with terrace (1390), and the late Lieut. Philip E. Webb, R.E., is represented by Hockleysole Manor, Kent, where his alterations and additions show the greatest promise and ability as an architect (1387), for this was a little work of much skill and good taste.

Our Illustrations.

THE UNION JACK CLUB, WATERLOO BRIDGE ROAD, S.E.

This drawing is on view at the Royal Academy Exhibition. It shows the proposed extension to this very important Club for the Sailors and Soldiers who arrive at and depart from Waterloo, and the accommodation thus to be provided is very urgently needed. The scheme shown on the plans gives a large saloon of some 4,700 super feet and a big billiard-room with six full-sized tables, new kitchens and sculleries on the ground floor, and a new dining-room with serving-room which gives service to all these new rooms, various other alterations to the offices and other administrative departments. Above there are two hundred and eighty-three new bedrooms with baths, etc., all connected with the present bedroom floors. The elevation to Sandell Street is intended to be in Portland stone and Crowborough bricks, but the bays at each end will connect with the existing buildings and will follow them in material. It will be noticed that the upper floors of the Sandell Street, façade will be set back about six feet to give skylights to the billiard-room and help the light and air in the somewhat narrow street. The architect is Mr. Walter Cave, F.R.I.B.A., 22, Sackville Street, W.

TRINITY MANOR, JERSEY.

This photograph is at the Royal Academy this year. It illustrates the garden front of Mr. Athelstan Riley's house, erected at La Trinité, Jersey, from the designs of Mr. Reginald Blomfield, R.A. We gave a plan of the building when the work was put in hand, and a view of the entrance, or other side of the house, appeared at the same time in our issue of May 3, 1912, with some particulars. That drawing was exhibited also at the Royal Academy. Two years previously Mr. Blomfield was represented in the summer exhibition by a view of the house, also showing the new gardens, but that scheme was subsequently abandoned, and over the central block a very steep roof was adopted to the same pitch as that of the house at Montainville, which was built in the French manner, at the end of the fifteenth century. Local granite has been employed for the walls and Delabole small slates cover the roof with lead hips, ridges and finials.

THE GARDEN FRONT, ARDENRUN, BLINDLEY HEATH, GODSTONE, SURREY.

This photograph is one of three of this house now on view at the Royal Academy by the president of the R.I.B.A., Mr. Ernest Newton, A.R.A. We gave the plans and a foreshortened perspective drawn by Mr. F. L. Griggs in our issue of January 28, 1910. This view was exhibited also at the Academy. The walling is faced with Chichester purple clamp bricks with Wrotham deep red dressings to the windows. Portland stone furnished the plinth quoins and porches to the entrances. The cornices are of wood and deep red Wrotham tiles cover the roofs. The aspect is north and south, the main approach being from the north towards which the kitchen and billiard-room are placed. Messrs. Trollope and Sons were the general contractors. The staircase is in Italian walnut, like the panelled hall. The dining-room and billiard-room are treated with pine finishings. A detail drawing of the porch will be found in our issue of February 4, 1910.

THE LORD WANDSWORTH INSTITUTION, LONG SUTTON, HAMPSHIRE.

These crayon drawings illustrate one of the houses erected in connection with this extensive institution, of which Mr. E. Guy Dawber, F.R.I.B.A., is the architect. The perspectives are now on view at the Royal Academy exhibition. On May 17, 1915, we gave a prospect from the south on a double-page plate, showing the main central buildings, and a general plan from the exhibit then at the Royal Academy. Nothing precisely similar to this scheme has been carried out in this country for the education of agricultural students on such an extensive scale. The residential homes, when completed, will enclose a great quadrangle. The home illustrated to-day is typical of the remainder. It provides for twenty boys, with departments for the master and the matron. The urgency of such an educational establishment has been demonstrated by what has happened in consequence of the war, but, unfortunately, everything connected with building has in the meantime been hung up by the shortage of labour and materials due to the same cause. The foundations, etc., have been got in, and immediately an opportunity of going ahead occurs the work will be pressed on with. The farm premises and stables put up in connection with this institution were designed by Mr. Reginald Blomfield, R.A., who also did the steward's house and entrance gateway to the estate. A general front view, with plans, will appear at an early date.

The cost of working the Tower Bridge last year was £15,276. The bascules were lifted 3,354 times.

The Leigh and District Master Builders' Association have decided to give advances to their workmen ranging from 4s. to 9s. a week.

Mr. Archibald Colville, of The Moorings, Motherwell, chairman of Messrs. David Colville and Sons, Limited, of the Dalzell Iron and Steel Works, a member of the Board of Trade Iron and Steel Industries Committee, has left personal estate in the United Kingdom amounting to £292,025.

At an inquest held at Shrewsbury on Saturday into the death of Mrs. Brown (39), of Elmbank, Ellesmere Road, wife of an architect practising in the town, the husband was severely censured by the coroner and jury. Mrs. Brown was taken ill while visiting a neighbour, and died shortly after being carried home. Mr. Brown, in his evidence, denied that his wife had been kept short of food or money. The jury found that death was due to weakness accelerated by deficient nutrition, brought on by neglect.—The Coroner told the husband the jury thought his conduct had not been what it should have been, and that he had had a very narrow escape of being tried for manslaughter. He had nothing more to say, save that he was in perfect agreement with the jury.

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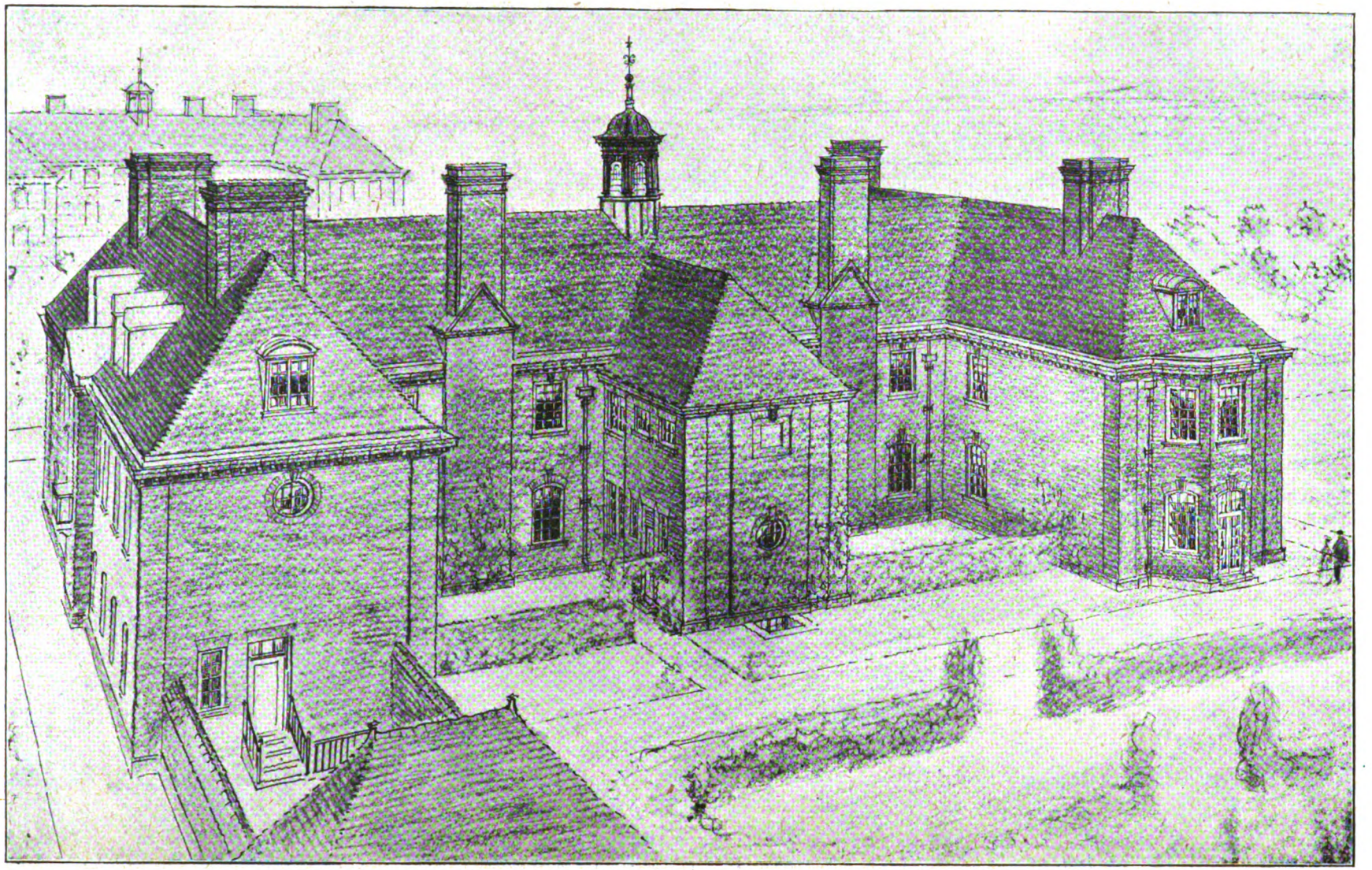

HOUSE FOR BOYS, LORD WANDSWORTH INSTITUTION, LONG SUTTON, HANTS.
Mr. E. Guy Dawber, F.R.I.B.A., Architect.

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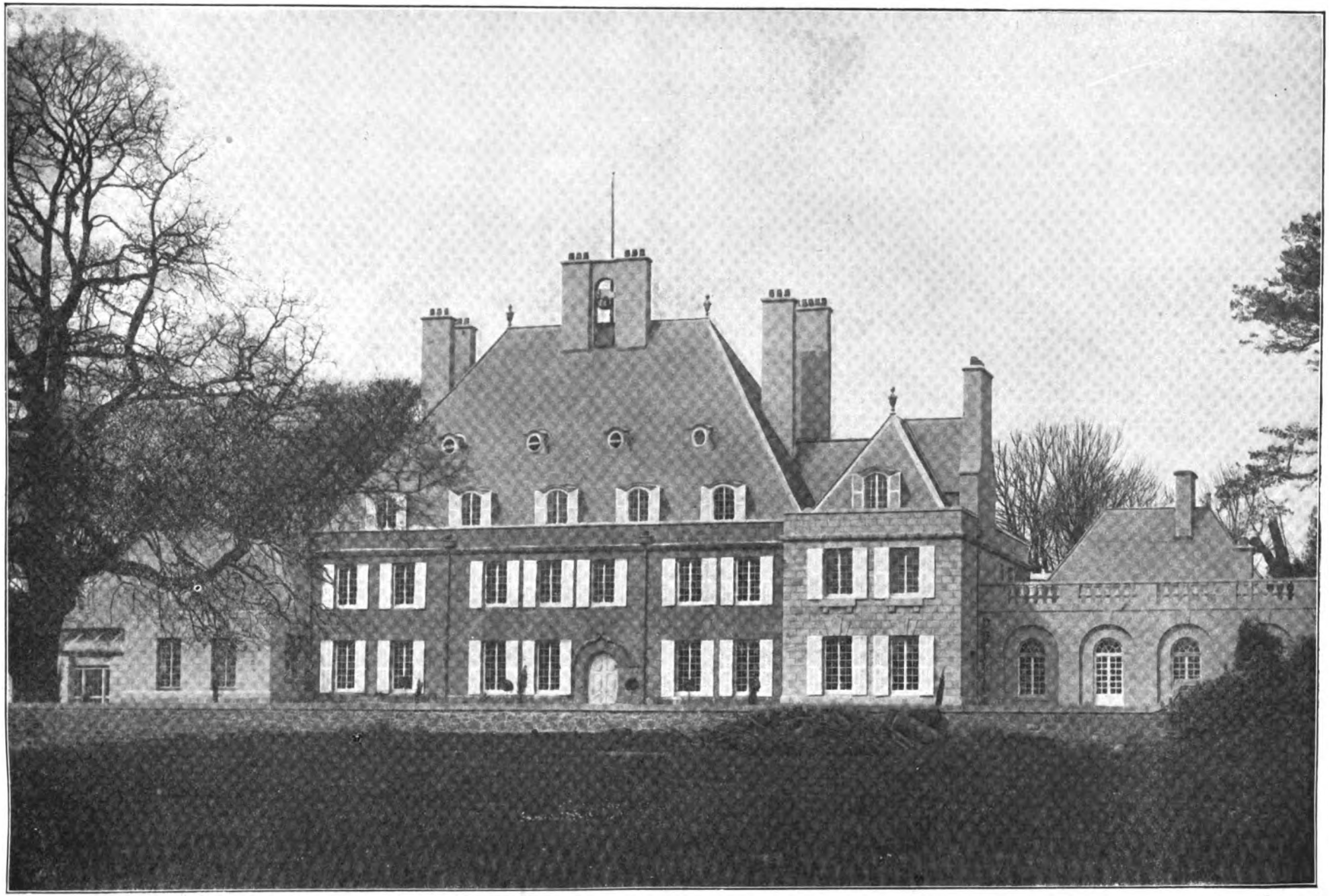

TRINITY MANOR, JERSEY, ERECTED FOR MR. ATHELSTAN RILEY.—Mr. Reginald Blomfield, R.A., Architect.

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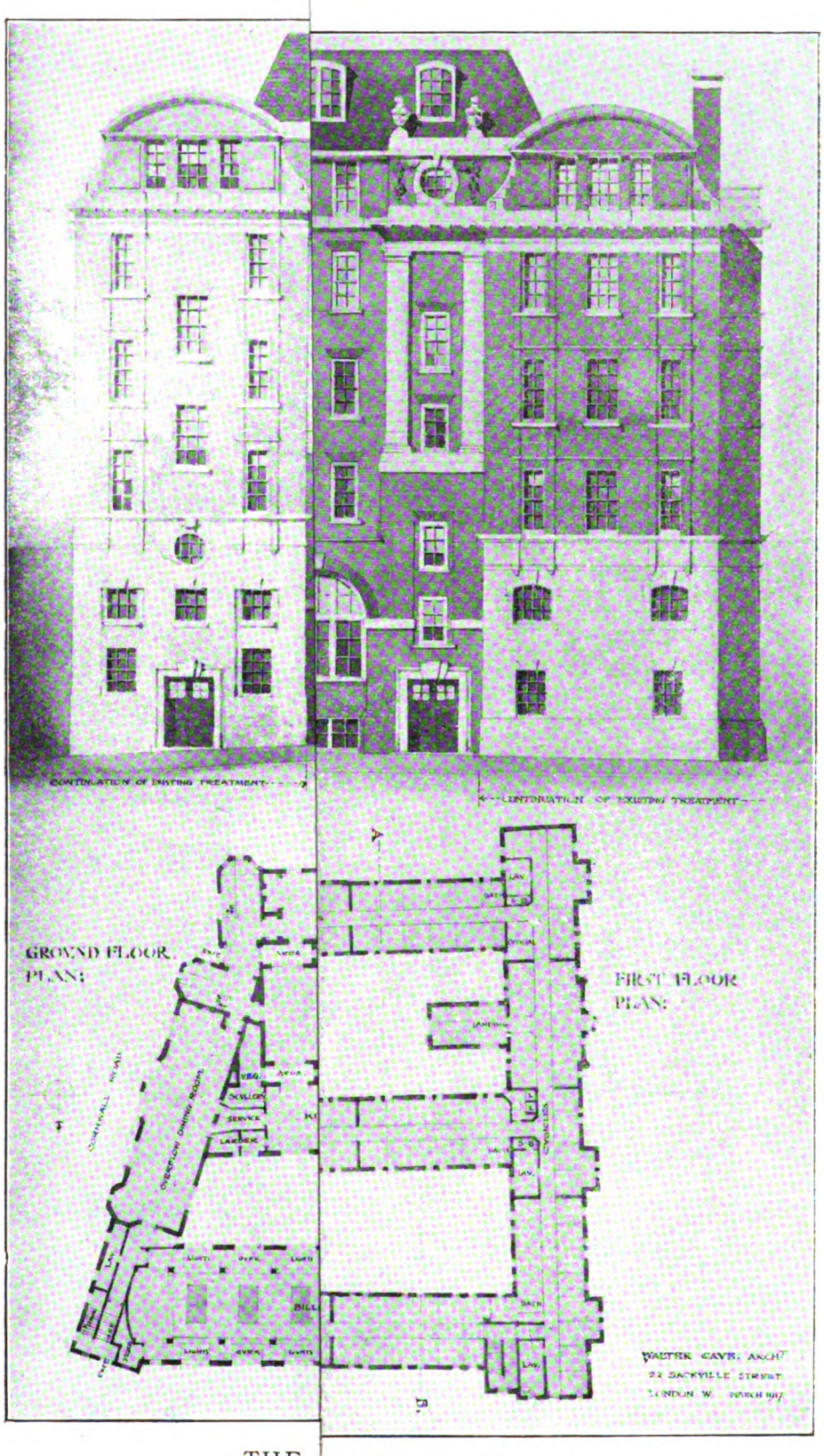

THE , F.R.I.B.A., Architect.

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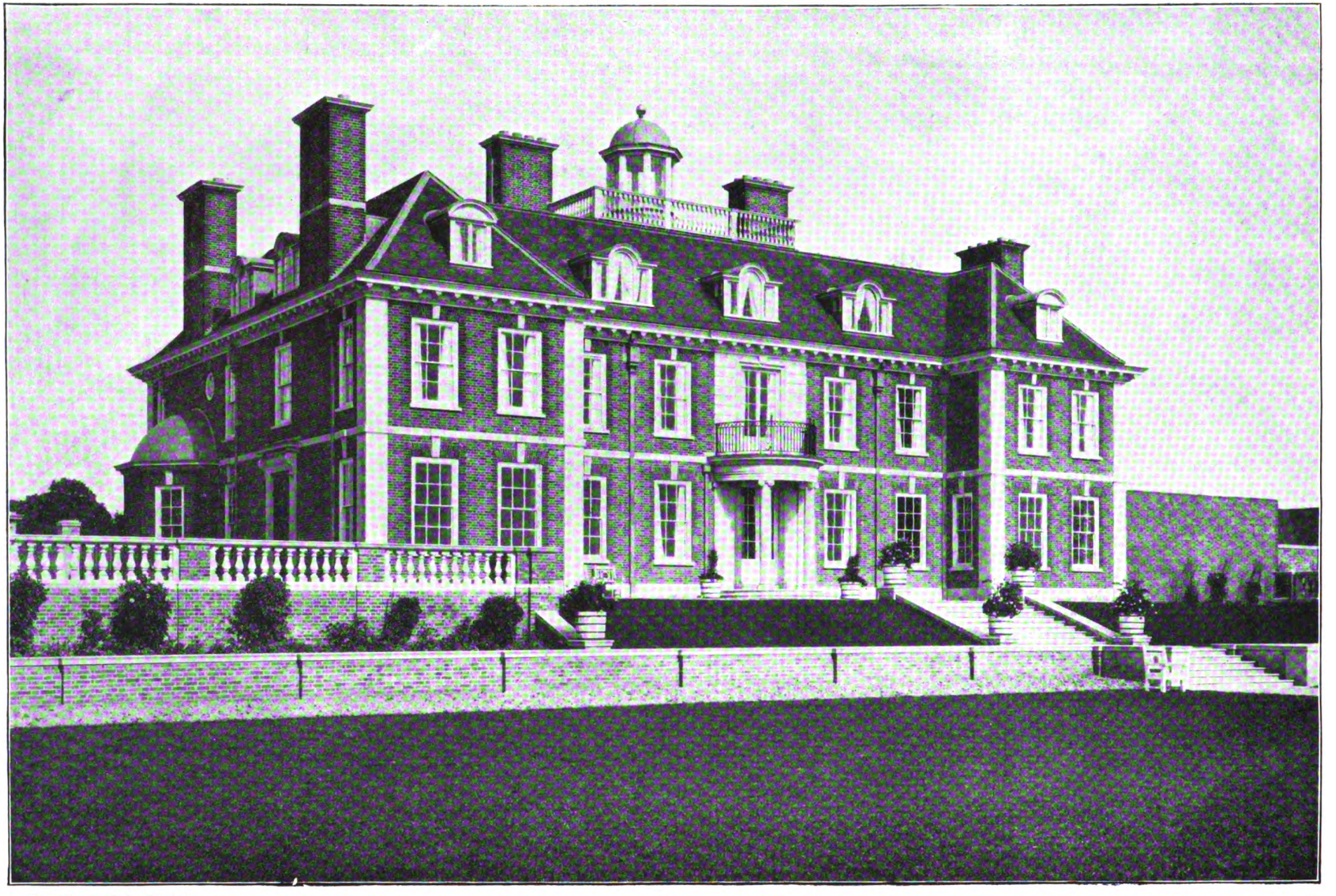

Thos. Lewis, Ltd., Photo.]

ARDENRUN PLACE, BLINDLEY HEATH, GODSTONE, SURREY: THE GARDEN FRONT.
Mr. ERNEST NEWTON, A.R.A., P.R.I.B.A., Architect.

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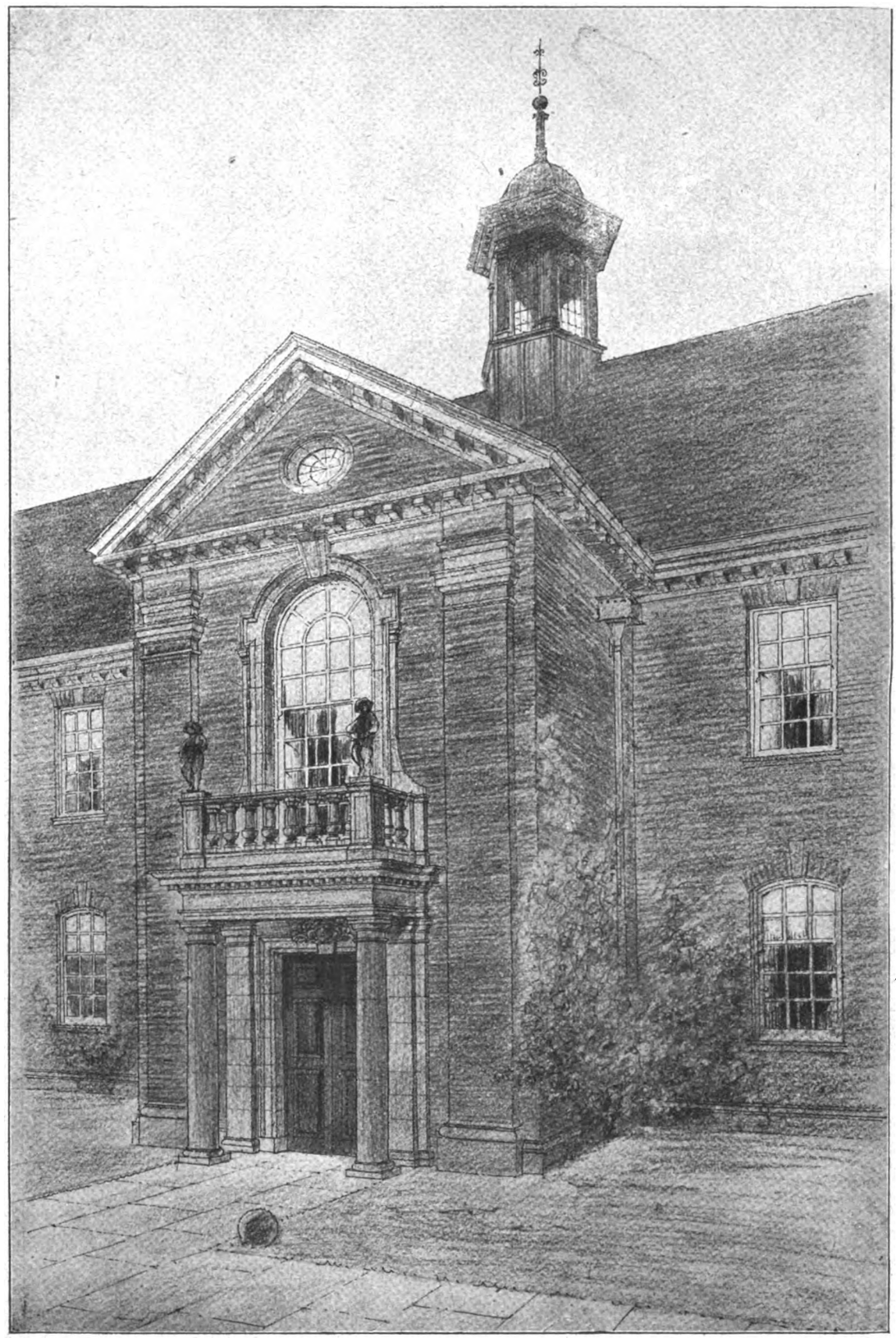

HOUSE FOR BOYS, LORD WANDSWORTH INSTITUTION, LONG SUTTON, HANTS.—Mr. E. Guy Dawber, F.R.I.B.A. Architect.

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ANCIENT EARTH DWELLINGS.

At the last monthly meeting of the Society of Antiquaries of Scotland, held at 24, George Street, Edinburgh, a communication was read by Mr. David MacRitchie, F.S.A.Scot., on "Earth Houses and Their Occupants." Mr. MacRitchie stated that earth houses, more correctly described in Gaelic as *tigh fo thalaimh*—underground houses—were found in various parts of the British Isles and in foreign countries, and that they were now generally admitted to have been dwellings. Though it was to a certain extent true that there were also such constructions used for storehouses, tombs, and temples, the evidence for sepulchral use was not to be found in this country. The proof which he adduced for their use as habitations was the occurrence within them of the debris of food used by man—bones of the ox, deer, and other like creatures, shells and shell-fish, of ornaments of bronze, and of pottery.

Mr. MacRitchie illustrated a number of instances from Ireland in which obstacles had been placed in the passage way so as to obstruct the ingress of an enemy or undesired visitor, and he pointed out that the same idea was not wholly absent from Scottish earth houses, a notable instance being in the mound dwelling at Milton of Whitehouse, in the Braes of Cromar, Aberdeenshire, where the passage appeared to have been intentionally blocked in two places by large upright stones. Mr. MacRitchie, while maintaining that earth houses were built for occupation, expressed his opinion that their use was probably casual and intermittent, and throughout the winter months, and that they were abandoned by their inhabitants during the milder seasons, when they led a nomadic life

nsidering the date of these buildings
M cRitchie pointed out that the existence
in e of the stones showing undoubtedly
D n workmanship, as at Crichton, in Midlothian, and the presence of a Roman pottery was sufficient evidence of some at least having been erected and utilised during the period of the Roman occupation, or shortly subsequent thereto.

STATUES AND MEMORIALS.

ELLAND.—The people of Elland have decided to provide an effective memorial to the late Canon Winter, who was rector of the parish for nearly a quarter of a century, and died with tragic suddenness in the vestry of the church after preaching on January 14 last. The scheme includes the erection of a rood-screen and two side-screens in the parish church, together with a monument over the grave in the Elland Cemetery, at an estimated cost of £590; the restoration of the Thornhill Chapel (a portion of the church), the cost being estimated at £300; and the improvement of the sanctuary, at an estimated expenditure of £500; or a total cost of £1,390. It is intended to execute the work in three parts, and in the order enumerated. Mr. H. Fellowes Prynne has charge of the scheme and the work.

THE LATE LORD KESTEVEN.—Captain Thomas Carew Trollope, 3rd Baron Kesteven, of Casewick Hall, Stamford, lost his life in the early part of November, 1915, owing to the vessel which was carrying him to his military duties in the East being torpedoed. To perpetuate his memory in the district, his mother, the Hon. Mrs. Trollope, has just erected in the churchyard at Barholm a cross, which was formally dedicated last week. The cross has been built of Clipsham stone, and is the work of Messrs. Thompson and Son, of Peterborough, who were represented at the dedication by Mr. H. Wood. It stands on a substantial base, and is crowned by a carved representation of Calvary. In one of the niches is a figure representing the late Baron in military garb, in a second Bishop Martin (to whom the church is dedicated), in a third the Madonna and Child, and in the fourth St. George. On another part is a representation of a stag's head, with an oak leaf in the mouth, this being taken from the Kesteven crest.

TRADE NOTES.

Boyle's latest patent "air-pump" ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, have been employed at the drawing office of the National Projectile Factory, Dudley.

PARLIAMENTARY NOTES.

OFFICE OF WORKS VOTE.—The House went into Committee of Supply last week on a Vote of £91,150 for the Office of Works. Sir A. Mond (Swansea Town, L.) said that the small increase shown on the Estimates was practically entirely due to the natural increments of salaries. The departmental staff consisted of 2,925 employees, of whom 2,228 were men, of whom 956 had joined the forces. The total number of unmarried men of military age of all classifications eligible for service in the Department was 123, and of married men 225. Since his appointment he had succeeded in obtaining the release of a further 69 men. Therefore, so far as the Office of Works was concerned, the attacks on Civil Servants for not joining the forces were entirely unjustified. No fewer than 48 members of the staff had fallen in action. A great deal of the work of the Department had been of a character which did not fall directly on the Estimates for the Office of Works, but it was carried out for the War Office, the Ministry of Munitions, and other Departments. Since 1916 in the London area alone 33 temporary buildings to meet the extension of departments had been erected. Eight or nine military hospitals had been erected, furnished, and fitted out by the Department, and a large number of important munition factories and stores had been built. These buildings were permanent structures, and they opened up a prospect of cheaper construction in the future as the result of lessons learnt during the war. In connection with the unfortunate explosion which occurred in the East End of London on January 19, the work of reinstatement was begun on January 25, and by March 1 over 800 houses in various stages of dilapidation and ruin had been re-roofed, slated, glazed, and rendered weather-proof. In addition to these, 106 houses had been completed and handed over, along with a number of stores, stables, and other buildings. His last topic was the question of a National War Museum. He hoped the House would entrust the First Commissioner of Works with the duty of organising a museum which should present to posterity the great effort made by the Empire and its Allies, and also the efforts made by our opponents in the great war. It was high time to act, for already many records of heroic deeds had disappeared, had been scattered and lost. The function of a committee, of which he was chairman, was to gather together important data with the object of forming this museum as a national war memorial, in which would be collected valuable and interesting records so that future generations might realise what their forefathers had done, both on sea and land. To make the scheme as comprehensive as it ought to be the assistance of the Government would be required. The committee consisted of himself, as chairman, ex officio; Sir Martin Conway (Director-General), Commander C. C. Walcott, R.N., representative of the Admiralty; Mr. B. B. Cubitt, C.B., representative of the War Office; Colonel G. R. Stansfeld, C.B., representative of the Ministry of Munitions; Professor C. W. C. Oman; Mr. Ian Malcolm, M.P.; and Mr. C J. Ffoulkes, secretary and curator. On the Vote for the Houses of Parliament building, Mr. Dickinson (L., North St. Pancras) advocated the removal of the grille in front of the Ladies' Gallery of the House of Commons. Sir A. Mond, replying, said he was glad the question had been raised. Technically, he understood he had the authority to remove the grille himself, and, although the attendance on the present occasion was small, an overwhelming opinion had been expressed in favour of its removal. Certainly he intended to take action in the matter, and much would depend on the opinion expressed by the House. He saw no opportunity for discussion, but he hoped it would be possible to ascertain the opinion of members, perhaps, by means of a ballot. Naturally he did not wish to do anything which would run counter to the wishes of a large number of members. The Vote was agreed to.

Our Office Table.

Though the controversy concerning the wisdom or otherwise of holding an Autumn Exhibition in the Walker Art Gallery has now almost subsided, there are those who still cling to the view that for the sake of the artists there should be an exhibition of works by local painters. An influential section of local artists does not hesitate to urge that such an exhibition would be of little or possibly no value to them, as its power to attract the public would not be anything like as great as an exhibition comprising works by the leading artists of the country and the Continent. It is not that the local artists disparage their own talents, but they frankly recognise that the general comprehensive exhibition such as has been held for so many years is the only one to draw the public sufficient in numbers and opulence to help them in the way of purchases.

Lady Butler, painter of "The Roll Call" and other famous battle pictures, has arrived in London from Ireland for the opening of an Exhibition of Pictures entitled "Glimpses of the Great War," which will shortly be held at the Leicester Galleries, Leicester Square. These water colours are the output of two years' work, and Lady Butler has decided to present the proceeds of the sale of the pictures to the Lord Roberts Memorial Fund for Workshops for Disabled Soldiers and Sailors. Included in the exhibition will be Lady Butler's famous picture, "Steady, the Drums and Fifes," which will be lent by the Middlesex Regiment. Two years ago an exhibition of Lady Butler's pictures was held in these Galleries by which the sum of £1,000 was raised for the Officers' Families Fund.

Speaking at the annual meeting of the Incorporated Free and Open Church Association, at Westminster, last Wednesday, the Bishop of Birmingham spoke of an experience he had when his son was leaving for the front. In order to pray he went to the parish church of the town he was in and found the door locked. He thereupon went across to a Roman Catholic church, which, as usual, was open. His legal position was not clear, but if allowed to do so he stated his intention of insisting that all churches in his diocese should be cleared of pew rents. The clergy were not the stumbling-block; it was the laymen, the "pillars of the Church," the "best people," who insisted on their "right" to a "reserved seat."

A great art lottery, by license of the Board of Trade, in aid of St. Dunstan's Hostels for Blinded Soldiers and Sailors, the prizes being paintings, drawings, sculptures, etc., by a great many of the foremost artists of the day, and of the earlier schools. The works are on exhibition at the great bazaar at the Royal Albert Hall, opened by Queen Alexandra, from May 7 to 10, and afterwards at the Chenil Gallery, King's Road, Chelsea. The whole of the gifts, at present 300, and being added to daily, will be disposed of by means of a great lottery. Tickets, 5s. each, the drawing of which will take place at the St. Dunstan's Hostel, Regent's Park, on Tuesday, July 10, 1917, at 4 p.m. Those wishing to purchase tickets, or who are willing to undertake the sale of same, are invited to remit £2 10s. for a book of ten tickets. The Committee will refund the full amount of any unsold tickets returned not later than July 7. All communications and remittances should be made to the Hon. Secretary, Kineton Parkes, Chelsea Art Union, Chenil Galleries, 183a, King's Road, Chelsea, London, S.W. 3.

The fact that a good-sized private dwelling-house is being built between Berkswell and Tile Hill, partly with the labour of eligible men, was commented on at Coventry Tribunal last Friday, when a bulk claim was made for exemption of a slating firm's men. The Military Representative said the case was described in the district as a public scandal, and the military authorities were determined as far as they could to stop the work continuing by eligible and badged men. In giving temporary exemption to some of the men, the condition was imposed that they should do no private work.

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EFFECT OF EXCESS WATER IN CONCRETE.*

BY DUFF ABRAMS,
Professor in Charge, Structural Materials Research Laboratory, Lewis Institute, Chicago.

Experience has indicated about what proportions of cement and aggregate must be used to give concrete of the necessary resistance for a given purpose, but little attention has been given to the interrelation of the effects of varying quantities of water on the resistance of the concrete. A thorough investigation of this subject is in progress at the Structural Materials Research Laboratory. These tests have shown the following relations to obtain:—

1. With a certain aggregate of the same grading and sufficient water to produce a concrete of a given plasticity, the strength of the concrete within the usual range of mixes, is proportional to the quantity of cement in a unit volume of concrete.

2. With a given aggregate and the same quantity of cement, the strength of the concrete is a maximum with the smallest quantity of water which can be used to produce a plastic mix; any increase in the quantity of water is accompanied by a very rapid falling off in the strength of the concrete.

3. With a given aggregate mixture, the same quantity of cement, and sufficient water to produce a concrete of definite plasticity, (a) the strength of the concrete increases with the "coarseness" of the aggregate up to a certain limit; (b) this limit of "coarseness" is higher for a larger quantity of cement and lower for a smaller quantity of cement; (c) the limit of "coarseness" of the aggregate which it is feasible to use varies slightly with the character of the material, being somewhat lower for a mixture of sand and crushed stone than for sand and well-rounded pebbles, and lower still for mixtures in which crushed stone or similar material is used as fine aggregate.

4. For given proportions of cement and aggregate the quantity of water required for a definite plasticity depends largely on the grading of the aggregate, and to only a minor degree on the character of the materials, shape of particles, etc.

5. For a given aggregate, the quantity of water required to give concrete of the same relative plasticity is directly proportional to the quantity of cement.

The tendency has been during recent years to use entirely too much water; in many instances the water used is 50 to 100 per cent. in excess of the quantity which gives the highest strength, resulting in concrete of not more than 25 to 50 per cent. the strength that should have been obtained with the same cement and aggregate and a proper quantity of water. While some sacrifice in strength is generally necessary in order to secure concrete which may be handled and placed at low cost, it is absurd to sacrifice 50 to 75 per cent. of the strength which is practically available in this way. While the injurious effect of excess water in concrete has been given little attention, a great deal of emphasis has been placed on the benefits to be derived from the use of coarse, well-graded aggregate.

The experimental work referred to above has already thrown much new light on this subject We are forced to the conclusion that the chief advantages of well-graded and coarse aggregate as compared with poorly-graded aggregate comes from the fact that the concrete can be mixed to a workable plasticity with less water, and not to any inherent difference in the behaviour of aggregate of different sizes. In other words, while coarse, well-graded aggregate is highly desirable, little or nothing is gained by using aggregates of the highest grade unless we take advantage of the fact that it can be mixed with correspondingly less water. This makes it apparent that many of the shortcomings of concrete made of fine or poorly-graded aggregate should be charged to the additional water required to mix the concrete.

It is as important that an upper limit be placed on the quantity of water as it is that a lower limit be placed on the quantity of cement in the batch. It would be just as consistent to specify the quantity of aggregate and water and leave the proportioning of the cement to the judgment of the mixer foreman as to specify the quantity of cement and aggregate and leave the proportioning of the water to the mixer gang. Exactly the same effect is produced by the use of an excess of water as by a deficiency in cement; and it is more important now that special attention be given to the water in concrete, since the present methods give reasonable assurance that the proper quantity of cement is used.

All the benefits which may arise from using good cement, coarse, well-graded aggregates, thoroughly mixing the concrete, etc., are completely nullified if an excess of water is used in the mix.

"In mixing concrete use the least quantity of water that will produce a workable mix, then give the concrete as much water as possible after it has begun to harden," is the only safe rule to follow.

Probably the greatest improvement which can be made in our present methods of manufacturing concrete will come from a better understanding of the very injurious effect of excess water and a saner practice in proportioning this important element of the mix.

* From "Concrete Highway Magazine."

Building Intelligence.

GRETNA.—The foundation-stone of the first of two new churches to be erected by the Scottish Episcopal Church has been laid. The scheme originally included the erection of two churches, two halls, and two parsonages, at a total cost of £16,570. The Government have given the sites and provided grants in aid for the churches and parsonages, but it has been found necessary to delete the halls and one parsonage from the scheme in the meantime, thus reducing the expenditure by £5,100.

CHIPS.

A crucifix made of pieces of the Zeppelin brought down in the village has been placed in Potters Bar parish church.

The committee of the Woolwich Day Nursery have been granted permission to erect a crèche at the corner of St. Mary Street and Orchard Street.

The death is announced, on the 2nd inst., at his residence, 11, Buckleigh Road, Streatham Common, S.W.16, following an operation, of Mr. Samuel Nixon, surveyor, of 82, Victoria Street, S.W., in his 66th year.

About seventy years ago Ruskin bought for £88 a water-colour drawing of "Constance," which he characterised as one of the "most finished and faultless works" of Turner's last years, and said that the day he brought it home to Denmark Hill was one of the happiest of his life. Last Friday in the Beecham sale at Christie's, the drawing fetched £4,500.

Last Saturday evening the monument erected at St. Paul's, Hammersmith, to the memory of Alderman James Smith in 1668, and which was recently disinterred from beneath the vestry floor, was unveiled and dedicated. The monument has been re-erected by the Salters' Company, of which guild the alderman was a member, and has been placed in the sanctuary.

Sec. Lt. William R. Caseby, Royal Scots, attached Lancashire Fusiliers (killed in action), was a son of Mr. David Caseby, South Street, St. Andrews. Last July he was awarded the Military Cross for gallantry on the field. Before he entered the Army he was in the office of Messrs. Gillespie and Scott, architects, St. Andrews. He was twenty-one years of age.

Maxstoke Castle, Warwickshire, has been lent to the British Red Cross Society as a V.A.D. auxiliary hospital for convalescent soldiers. The castle, built in 1345, still consists of the greater part of the original building, and retains a large quadrangle, with corner and gateway towers. The whole is surrounded by a wide and deep moat and extensive grounds.

According to the Vancouver *Daily Province* of January 19, 1917, the City of Edmonton, Alberta, Canada, which some years ago adopted "single tax" as the principle of rating, has decided to abandon it. We understand that by "single tax" in connection with rating, buildings and improvements were not assessed to the rates which were imposed on the capital value of the bare site.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

Telegrams: "Timeserver, Estrand, London."
Telephone: Gerrard 1291.

RECEIVED.—A. H. and Co.—A. C. Co.—Sir W. H. B. and Co., Ltd.—R. C. and C. Co., Ltd.—W. and W.—W. and Son.—V. Ltd.—E. and R. Ltd.—Q. M. S.—F. A. N. and Co.—S. A. A.—V. de T. A. Co., Ltd.—W. C. Co., Ltd.—J. H. P.—W. and C.—G. and B.—R. B. and Son—S. T. S.—C. C. D. and Co.—I L. G. Co., Ltd.—A. V.—St. C. P. Co., Ltd.—B. O. Co., Ltd.—T. P. C.—N. and C.—R. L. C. and Co, Ltd.—H., Ltd.—W. S. and Co.

A. R. G.—Yes.

LIEUTENANT G. T.—Kindly forward.

PETRAMOS.—Thanks; no space open.

J. D. W.—We cannot undertake to write your specification.

ASPEN.—You are asking us to help you to evade a most wholesome law, and you know it.

Mr. E. W. M. Corbett, of Cardiff, has been elected on the council of the South Wales Institute of Architects, of which Mr. I. Cook Rees, M.S.A., of Neath, is the new president.

The Corporation of London have decided to alter and equip the shelter in Golden Lane as a centre for the treatment of venereal disease at a cost of nearly £1,400.

Another stained-glass memorial window has been added to Newington United Free Church, Edinburgh. It consists of two lights, and shows figures of Christ, in the act of sowing the seed, and the Angel Reaper, bearing a sheaf of wheat. The foliage introduced is indicative of spring and autumn. The window was designed and executed by Messrs. A. Ballantine and Son, Edinburgh.

The President and Council of the Royal Academy have purchased the following works under the terms of the Chantrey Bequest:—"Forward, the Guns" (oil painting), by Miss Lucy Kemp-Welch; "A Young Breton" (oil painting), by Mr. Glyn Philpot, A.R.A.; "The Sacristan" (head-marble), by Mr. Edward Lantéri; and "The Critic" (head-marble), by Mr. C. Webb-Gilbert.

At the Central Criminal Court last Thursday, before Judge Rentoul, the trial was continued of Benjamin Rubenstein, 23, carpenter, on the indictment charging him with stealing 14,000 francs, the money of Mr. Lazarus Edward Warshaw. The defendant pleaded "Not guilty." The jury were unable to agree, and were discharged from giving a verdict. The case was adjourned until the next sessions.

Mr. Joseph A. Senecal, a well known architect of St. Boniface, Man., passed away recently at the age of 76 years, having been born at St. Marc, Que., in 1841. His chief works included St. Boniface Cathedral, Ste. Anne des Chenes' Church the Holy Ghost Church, Winnipeg, and the chapel of the Misericordia Hospital, Winnipeg. His last work was the centre wing of the St. Boniface Hospital, in 1914.

The Barrow housing problem, which has become still more acute of late, has been considered by the Barrow Town Council, and it was decided to enter into an agreement with the Ministry of Munitions for that authority to build 250 houses for munition workers at Vickerstown, Walney Island. The property will be managed by the corporation, who at the end of five years will take over the houses at a fair valuation.

Sec. Lt. John A. M'Leod (killed in action) was the youngest son of the late Mr. John M'Leod, painter and decorator, and Mrs. M'Leod, Green Lodge, Ayr. He served an apprenticeship with Mr. William Cowie, architect, Ayr, and emigrated to Canada in 1912. He joined the Canadians in November, 1914, and saw much fighting with them in France. In March of last year he received a commission. Sec. Lt. M'Leod was twenty-six years of age.

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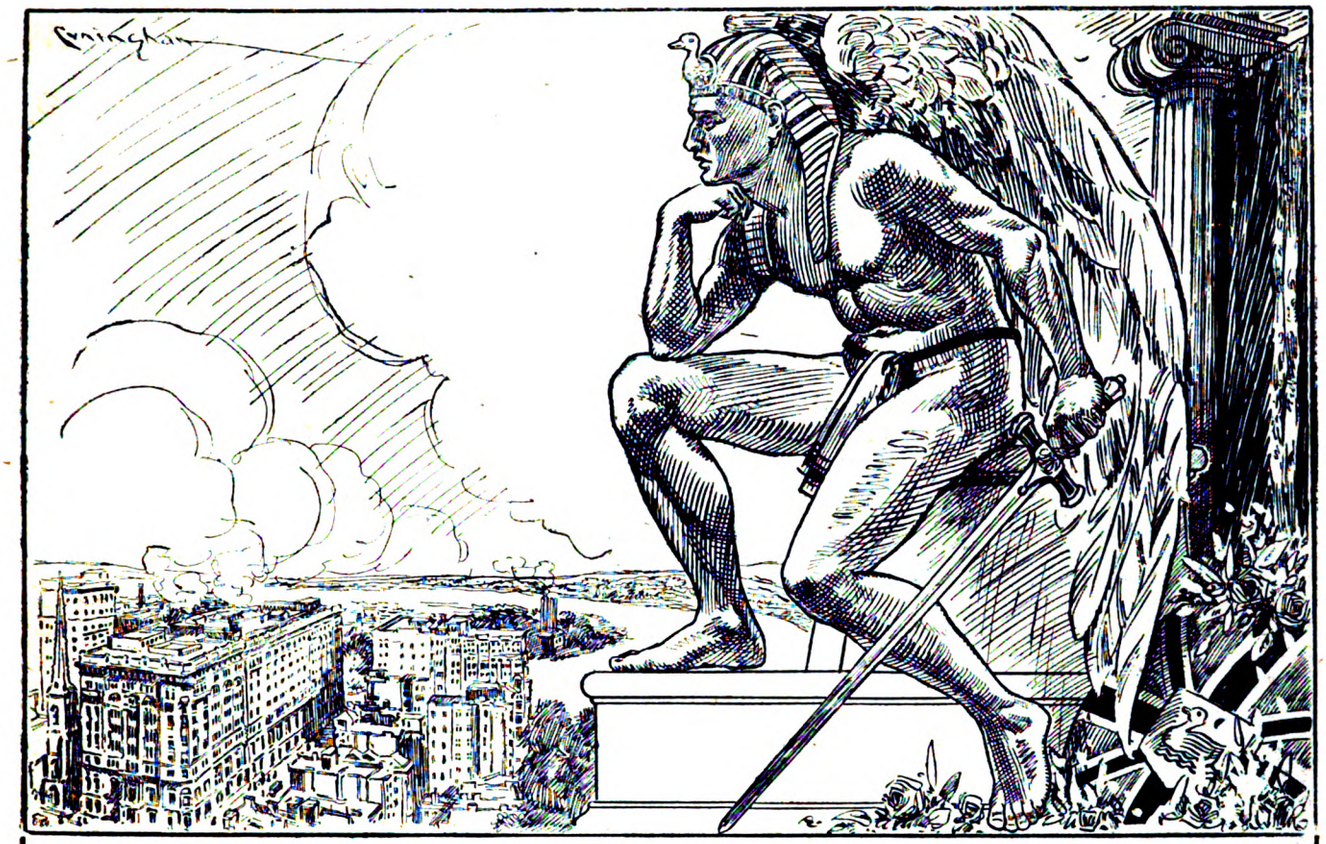

PUDLO

ON FLAT ROOFS.

Concrete Roofs in all parts of the world have been constructed with Pudloed cement. Sloping roofs, built of mesh metal sheeting with a 1½-inch Pudloed granolithic rendering have been fixed. Domes have been similarly formed upon the Town Hall at Chadderton and upon the Chorlton-cum-Hardy Free Library.

Owing to the Porosity of ordinary cement concrete, many Architects were doubtful as to the success of Pudloed roofs. Failure to waterproof cement roofs is impossible when our simple instructions are followed. Several Architects have kindly allowed us to use their names as references.

PUDLOED CEMENT FLAT ROOFS have been constructed in the following towns:—

Aberdeen	Burnley	Eastbourne	Lytham	Nottingham	Sheffield
Bedford	Cambridge	Exeter	Londonderry	Oldham	South Shields
Belfast	Cardiff	Faringdon	Manchester	Orpington	Stevenage
Berwick	Chelmsford	Frome	Market Harboro'	Oxford	Torquay
Birmingham	Chesterfield	Hayward's Heath	Middlesbrough	Paignton	Warrington
Blackpool	Chorlton-cum-Hardy	Huddersfield	Narboro (Leicester)	Portree (Skye)	West Hartlepool
Bolton	Coventry	Hull	New Brighton	Plymouth	Wigan
Bournemouth	Derby	Huntingdon	Newcastle-on-Tyne	Preston	Winchester
Bradford	Draycott	Keyworth	Newport (Mon.)	Rotherham	Woolwich
Brighton	Dublin	Leicester	North Shields	Swansea	York
Bristol	Durham	Liverpool	Norwich		

Used by the War Office, the Admiralty, the India Office, the General Post Office, the Crown Agents, the Office of Works, the Ministry of Munitions. Tested by Faija, Kirkaldy, Cork University, the Japanese and Spanish Imperial Governments, and the most eminent experts.

BRITISH! and, apart from patriotism, the best. Manufactured by Kerner-Greenwood & Co., Ann's Square, King's Lynn.

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LATEST PRICES.

N.B.—All prices must be regarded as merely approximate for the present, as our usual sources of information are in many cases failing us.

TIMBER.

Owing to stoppage of supplies all prices have advanced considerably.

IRON.

Rolled Steel Joists, English..... Compound Girders, Ordinary Sections ..... Compound Stanchions ..... Angles, Tees, Channels and Flitch Plates ..... Wrought-Iron Girder Plates .... Steel Girder Plates ..... Steel Sheets (Single or Double) .. Steel Strip ..... Basic Bars ..... Mild Steel Bars ..... Steel Bars, Ferro-Concrete Quality (basis price) ..... } Prices controlled by Ministry of Munitions.

	Per ton.			Per ton.
Bar Iron, good Staffs	£16 0 0	to	£17 0 0	
Do., Lowmoor, Flat, Round, or Square, to 3½ cwt.	24 0 0	,,	—	
Do., Staffordshire Crown	16 0 0	,,	16 10 0	
Boiler Plates, Iron—				
South Staffs	8 0 0	,,	8 15 0	
Best Sneedshill	9 0 0	,,	9 10 0	
Angles, 10s., Tees 20s. per ton extra.				
Builders' Hoop Iron, for bonding, £18 10s. to £19 10s.				
Ditto galvanised, £32 to £32 10s. per ton.				
Galvanised Corrugated Sheet Iron—	No. 18 to 20.		No. 22 to 24.	
6ft. to 8ft. long, inclusive gauge	Per ton. £30 0 0	to	Per ton. £30 10 0	
Best ditto	32 0 0	,,	32 10 0	
Cast-Iron Columns	13 10 0	,,	14 0 0	
Cast-Iron Stanchions	13 10 0	,,	14 0 0	
Rolled-Iron Fencing Wire	8 15 0	,,	9 5 0	
Rolled-Steel Fencing Wire	7 15 0	,,	8 0 0	
,, ,, ,, Galvanised	6 5 0	,,	6 15 0	
Cast-Iron Sash Weights	7 0 0	,,	7 10 0	
Cut Floor Brads	24 0 0	,,	24 5 0	
Corrugated Iron, 24 gauge	27 0 0	,,	28 0 0	
Galvanised Wire Strand, 7 ply, 14 B.W.G.	14 5 0	,,	—	
B.B. Drawn Telegraph Wire, Galvanised—				
0 to 8	9	10	11	12 B.W.G.
£10 10s.	£10 15s.	£11 0s.	£11 5s.	£11 15s. per ton
Cast-Iron Socket Pipes—				
3 in. diameter	£7 5 0	to	£7 12 6	
4 in. to 6 in.	7 0 0	,,	7 2 6	
7 in. to 24 in. (all sizes)	7 7 6	,,	7 12 6	
[Coated with composition, 5s. 0d. per ton extra. Turned and bored joints, 5s. per ton extra.]				
Pig Iron—	Per ton.			
Cold Blast, Lilleshall	177s. 6d.	to	182s. 6d.	
Hot Blast, ditto	115s. 0d.	,,	125s. 0d.	
Wrought-Iron Tubes and Fittings—Discount off Standard Lists f.o.b. (plus 2½ per cent.)—				
Gas-Tubes	52½ p.c.			
Water-Tubes	47½ ,,			
Steam-Tubes	42½ ,,			
Galvanised Gas-Tubes	35 ,,			
Galvanised Water-Tubes	26½ ,,			
Galvanised Steam-Tubes	20 ,,			

OTHER METALS.

A licence must be obtained from the Director of Materials (A.M. 2 (E).), Hotel Victoria, Northumberland Avenue, S.W., and should accompany orders for quantities over 1 cwt.

	Per ton.			Per ton.
Lead Water Pipe, Town	*£39 0 0	to	—	
,, ,, ,, Country	*40 0 0	,,	—	
Lead Barrel Pipe, Town	*40 0 0	,,	—	
,, ,, ,, Country	*41 0 0	,,	—	
Lead Pipe, tinned inside, Town	*41 0 0	,,	—	
,, ,, ,, ,, Country	*42 0 0	,,	—	
Lead Pipe, tinned inside and outside, Town	*43 10 0	,,	—	
,, ,, ,, ,, Country	*44 10 0	,,	—	
Composition Gas-Pipe, Town	*42 0 0	,,	—	
,, ,, Country	*43 0 0	,,	—	
Lead Soil-pipe (up to 4½in.) Town	*42 0 0	,,	—	
,, ,, ,, ,, Country	*43 0 0	,,	—	
[Over 4½in. £1 per ton extra.]				
Lead, Common Brands	26 0 0	,,	—	
Lead, 4lb. sheet, English	38 10 0	,,	—	
Lead Shot, in 28lb. bags	—	,,	—	
Copper Sheets, Sheathing & Rods	168 0 0	,,	170 0 0	
Copper, British Cake and Ingot	147 0 0	,,	150 0 0	
Tin, English Ingots	260 0 0	,,	—	
Do., Bars	186 10 0	,,	187 10 0	
Pig Lead, in 1cwt. Pigs, Town	33 12 6	,,	34 12 0	
Sheet Lead, Town	*38 10 0	,,	—	
,, ,, Country	*39 10 0	,,	—	
Genuine White Lead	*53 10 0	,,	—	
Refined Red Lead	42 0 0	,,	—	
Sheet Zinc	129 0 0	,,	—	
Spelter	93 0 0	,,	110 0 0	
Old Lead, against account	26 0 0	,,	—	
Tin ..... per cwt.	13 0 0	,,	—	
Cut nails (per cwt. basis, ordinary brand)	1 5 0	,,	—	

* For 5 cwt. lots and upwards.

SLATES.

	in.	in.	£ s. d.	per 1,000 of
Blue Portmadoc	20 × 10 ..		11 17 6	1,200 at r. stn.
,, ,,	16 ,,	8 ..	6 0 0	,, ,,
First quality	16 ,,	10 ..	11 15 0	,, ,,
Blue Bangor	20 ,,	10 ..	12 0 0	,, ,,
,, ,,	20 ,,	12 ..	12 2 6	,, ,,
First quality	20 ,,	10 ..	11 15 0	,, ,,
First quality	20 ,,	12 ..	11 0 0	
,, ,,	16 ,,	8 ..	6 0 0	,, ,,
Eureka unfading green	20 ,,	10 ..	15 17 6	,, ,,
,,	20 ,,	12 ..	18 7 6	,, ,,
,,	18 ,,	10 ..	13 5 0	,, ,,
,, ,,	16 ,,	8 ..	10 5 0	,, ,,
Permanent Green	20 ,,	10 ..	11 12 6	,, ,,
	18 ,,	10 ..	9 12 6	,, ,,
	16 ,,	8 ..	6 12 6	,,

BRICKS.

(All prices net.)

First Hard Stocks	£2 2 0	per 1,000	alongside, in
Second Hard Stocks	1 16 0	,,	,,	[river.
Mild Stocks	1 14 0	,,	,,	,,
Picked Stocks for Facings	2 14 0	,,	delivered at rail'y. station.
Flettons	1 13 0	,,	,,	,,
Pressed Wire Cuts	1 18 0	,,	,,	,,
Red Wire Cuts	1 14 0	,,	,,	,,
Best Fareham Red	3 12 0	,,	,,	,,
Best Red Pressed Ruabon Facing	5 5 0	,,	,,	,,
Best Blue Pressed Staffordshire	5 7 0	,,	,,	,,
Ditto Bullnose	5 12 0	,,	,,	,,
Best Stourbridge Fire-bricks	7 0 0	,,	,,	,,
2½in. Best Red Accrington Plastic Facing Bricks	4 10 6	,,	Net, delivered in full truck loads London.

	Per 1,000
3½" Accrington Best Red Plastic Facing Bricks	£2 10 0
3½" ditto Second Best Plastic ditto	2 2 6
Ditto Ordinary Secondary Bricks	1 11 3
Ditto Plastic Engineering Bricks	1 17 6
Sewer Arch Brick, not more than 3½ in thickest part	£2 0 0
3½" Chimney Bricks fit for outside work	2 6 0
3½" ditto ditto through and through	2 0 0
3½" Beaded, Ovolo and Bevel Jambs; Octagons; 2½" and ½" radius Bullnoses; Stock patterns	3 7 6
Accrington Air Bricks, 9" × 2 course deep, each	0 0 6
Ditto ditto 9" × 1 course	0 0 3

Accrington Camber Arches:—

3 course deep 4½" soffit, per foot opening	0 1 3
4 ,, 4½" ,, ,, ,,	0 1 8
5 ,, 4½" ,, ,, ,,	0 2 1
6 ,, 4½" ,, ,, ,,	0 2 6
3 ,, 9" ,, ,, ,,	0 2 1
4 ,, 9" ,, ,, ,,	0 2 11
5 ,, 9" ,, ,, ,,	0 3 6
6 ,, 9" ,, ,, ,,	0 4 6

Net free on rail, or free on boat at works.

GLAZED BRICKS.

HARD GLAZES (PER 1,000).

White, Ivory, and Salt Glazed. Best.	Buff, Cream, & Bronze. Best.	Other Colours.	Seconds Coloured.
Stretchers—			
£14 17 6	£13 17 6	£16 7 6	£20 7 6	£15 7 6
Headers—			
14 7 6	13 7 6	15 17 6	19 17 6	14 17 6
Quoins, Bullnose, and 4½in. Flats—			
13 7 6	17 7 6	20 7 6	23 17 6	18 17 6
Double Stretchers—			
20 7 6	19 7 6	23 7 6	26 17 6	20 17 6
Double Headers—			
17 7 6	16 7 6	20 7 6	23 17 6	17 17 6
One side and two ends, square—			
21 7 6	20 7 6	24 7 6	28 17 6	21 17 6
Two sides and one end, square—			
22 7 6	21 7 6	25 7 6	29 7 6	22 17 6
Splays and Squints—			
19 17 6	18 17 6	24 7 6	27 7 6	20 7 6
Stretchers cut for Closers—			
15 17 6	14 17 6	17 7 6	21 7 6	16 7 6
Nicked Double Headers—			
18 7 6	17 7 6	21 7 6	24 17 6	18 17 6

Compass Bricks, Circular and Arch Bricks, not exceeding 9 × 4½ × 2½ in., of single radius, £6 per 1,000 over and above list for their respective kinds and colours.

The following prices of Special Bricks are plus 25 %:—

Plinth and Hollow Bricks, Stretchers and Headers—				
5d. each	4d. each	6d. each	6d. each	5d. each
Double Bullnose, Round Ends, Bullnose Stops—				
5d. each	4d. each	6d. each	6d. each	5d. each
Rounded Internal Angles—				
4d. each	3d. each	5d. each	5d. each	4d. each

Camber Arch Bricks, not exceeding 9 × 4½ × 2½ in., any kind or colour, 1s. 2d. each.

MOULDED BRICKS.

Stretchers and Headers—				
8d. each	8d. each	8d. each	8d. each	8d. each
Internal and External Angles—				
1/2 each	1/2 each	1/2 each	1/2 each	1/2 each
Sill Bullnose, Stretchers, and Headers—				
5d. each	4d. each	6d. each	6d. each	5d. each

	Per 1,000
Majolica or Soft Glazed Stretchers and Headers	£25 7 6
,, ,, Quoins and Bullnose	30 7 6

These prices are carriage paid in full truck loads to London Stations.

SAND AND BALLAST.

	s. d.		
Thames Sand	8 3	per yard,	delivered.
,, Ballast	8 3	,,	,,
Pit Sand	9 6	,,	,,
Best Washed Sand	10 0	,,	,,

CEMENT AND LIME.

	s. d.	s. d.	Per ton,
Best Portland Cement	45 0	to 48 0	delivered.
Ground Blue Lias Lime	25 6	per ton,	delivered.

Exclusive of charge for sacks.

	s. d.	s. d.	Per yard.
Grey Stone Lime	18 0	to 18 6	delivered.

Stourbridge Fireclay in sacks 35s. 0d. per ton at railway station.

STONE.*

	£ s. d.
Yellow Magnesian, in blocks .. per foot cube	0 3 3
Red Mansfield, ditto ..... ,,	0 2 9
White Mansfield, ditto ..... ,,	0 2 9
Red Corsehill, ditto ..... ,,	0 2 6
Darley Dale, ditto ..... ,,	0 2 5
Greenshill, ditto ..... ,,	0 2 4
Closeburn Red Freestone, ditto ,,	0 2 2
Ancaster, ditto ..... ,,	0 2 0
Beer Stone, delivered on rail at Seaton Station ..... ,,	0 1 1
Ditto, delivered at Nine Elms Station ..... ,,	0 1 7½
Chilmark, ditto (in truck at Nine Elms) ..... ,,	0 1 10½
Hard York, ditto ..... ,,	0 2 0
Do. do. 6 in. sawn both sides, landings, random sizes ..... per foot sup.	0 2 5
Hard York, 3 in. slab sawn two sides, random sizes ..... per foot cube	0 1 0
Bath Stone—Delivered in railway trucks at Westbourne Park, Paddington (G.W.R.), or South Lambeth (G.W.R.) per cube foot	0 1 7
Delivered in railway trucks at Nine Elms (L. & S.W.R.) .. ,,	0 1 8½
Delivered on road waggons at Nine Elms Depot ..... ,,	0 1 9½
Portland Stone—Brown Whitbed in random blocks of 20 ft. average, delivered in railway trucks at Westbourne Park (G.W.R.), South Lambeth (G.W.R.), or Nine Elms (L. & S.W.R.) ..... ,,	0 2 5½
Delivered on road waggons at Pimlico Wharf or Nine Elms Depot ..... ,,	0 2 6½
White Basebed—2d. per foot cube extra.	

* All F.O.R. London.

TILES.

	s. d.		Divrd.at
Plain red roofing tiles	42 6	per 1,000	ry. stn.
Hip and Valley tiles	5 6	per doz.	,,
Broseley tiles	52 6	per 1,000	,,
Ornamental tiles	55 0	,,	,,
Hip and Valley tiles	5 6	per doz.	,,
Ruabon red, brown, or brindled ditto (Edwards)	57 6	per 1,000	,,
Ornamental ditto	60 0	,,	,,
Hip tiles	4 0	per doz	,,
Valley tiles	3 0	,,	,,
Selected "Perfecta" roofing tiles: Plain tiles (Peake's)	46 0	per 1,000	,,
Ornamental ditto	48 6	,,	,,
Hip tiles	3 10½	per doz.	,,
Valley tiles	3 4½	,,	,,
"Rosemary" brand plain tiles	48 0	per 1,000	,,
Ornamental tiles	50 0	,,	,,
Hip tiles	4 0	per doz.	,,
Valley tiles	3 8	,,	,,
Staffordshire (Hanley) Reds or brindled tiles	42 6	per 1,000	,,
Hand-made sand-faced	45 0	,,	,,
Hip tiles	5 6	per doz.	,,
Valley tiles	5 6	,,	,,
"Hartshill" brand plain tiles, sand-faced	45 0	per 1,000	,,
Pressed	42 6	,,	,,
Ornamental ditto	47 6	,,	,,
Hip tiles	4 0	per doz.	,,
Valley tiles	3 6	,,	,,

OILS.

Rapeseed, English pale, per tun	£28 15 0	to	£29 5 0	
Ditto, brown ..... ,,	26 15 0	,,	27 5 0	
Cottonseed, refined	29 0 0	,,	30 0 0	
Olive, Spanish ..... ,,	39 10 0	,,	40 0 0	
Seal, pale ..... ,,	21 0 0	,,	21 10 0	
Coconut, Cochin ..... ,,	46 0 0	,,	46 10 0	
Ditto, Ceylon ..... ,,	42 10 0	,,	43 0 0	
Ditto, Mauritius ..... ,,	42 10 0	,,	43 0 0	
Palm, Lagos ..... ,,	32 5 0	,,	33 5 0	
Ditto, Nut Kernel ..... ,,	35 0 0	,,	35 10 0	
Oleine ..... ,,	17 5 0	,,	19 5 0	
Sperm ..... ,,	30 0 0	,,	31 0 0	
Linseed Oil ..... per gal.	0 5 5	,,	—	
Baltic Oil ..... ,,	—		—	
Turpentine ..... ,,	0 4 7	,,	—	
Putty (Genuine Linseed Oil) ..... per cwt.	0 14 9	,,	—	

GLASS (IN CRATES).

	15 oz.	21 oz.	26 oz.	32 oz.
English Sheet Glass	15 oz.	21 oz.	26 oz.	32 oz.
Fourths	5d. ..	6d. ..	7d. ..	8½d
Thirds	5½d. ..	6½d. ..	7½d. ..	9½d.
Fluted Sheet	6½d. ..	7½d. ..	— ..	—

	⅛ in.	¼ in.	⅜ in.
Hartley's English Rolled Plate	4d.	4½d. ..	4½d.

	White.	Tinted.
Figured Rolled	5d. ..	6d.
Repoussine	4½d. ..	5d.
Rolled Sheet	4½d. ..	—
Stippolyte	4½d. ..	—

The new isolation hospital for the Ely urban and rural districts, off St. John's Road, Ely, has been formally opened. The total cost, including equipment, is nearly £4,000. The builders were Messrs. Parren and Sons, of Erith.

A sum of £3,507 has been promised or received towards the cost of new wards to give 28 additional beds at the Ashton District Infirmary. The building scheme, which also includes additions to the Nurses' Home, is estimated to cost £4,000.

It is announced that the contract for £10,000,000 between the Government of New South Wales and Messrs. J. Norton Griffiths and Co. on account of public works has been cancelled by mutual consent owing to difficulties created by the war.

It is estimated by Lord Sydenham that in Scotland more than a million electrical horse power could be obtained from water. In Switzerland electrical horse power obtained from water costs £1 19s. per annum, which compares with £4 11s. 8d. in England from coal.

By an escape from a gas ring five members of a Thornaby-on-Tees family named Ward were badly gassed, and one, aged eight, was in a precarious condition. The five, whose ages ranged from seventy years to eight years, were discovered unconscious at breakfast-time, and were only brought round by artificial respiration.

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THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.2.

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OUR ILLUSTRATIONS.

The President's Lodge, Queen's College, Cambridge. Recent Restoration. Mr. Cecil G. Hare, Architect.

Luckley, Wokingham, Berkshire. Mr. Ernest Newton, A.R.A., P.R.I.B.A., Architect.

A War Memorial, All Hallows Church, Tottenham, N. To Lieut. Wilfred Herbert Everard Nield, B.A.(Oxon.), Royal Fusiliers. Mr. Maurice B. Adams, F.R.I.B.A., Architect.

House for Boys, Lord Wandsworth Institution, Long Sutton, Hants. Entrance front and plans. Mr. E. Guy Dawber, F.R.I.B.A., Architect.

Overdoor Embellishments and Overpanels. Semi-circular overdoor relief decoration in Louis XIV. style and panel decoration in Adam doorheads.

Currente Calamo.

Mr. Justice Astbury has taught the Corporation of Rotherham a useful lesson which may induce other authorities, on whose similar action in issuing demolition orders in high-handed fashion, we have had occasion to comment before. The corporation made a closing order in regard to a dozen houses in the borough, and the Local Government Board dismissed the owner's appeal. Demolition orders were made, and the owner let the time for appeal expire. She then asked that demolition might be delayed under Section 13 (3) of the Housing Act of 1910, undertaking to do necessary repairs. The corporation refused. She then issued a writ asking for an injunction to restrain closing till the corporation had heard, "according to law," her application for postponement. The judge granted the relief asked for, with costs. We think he was right. It transpired in evidence that at the Local Government Board inquiry a list of "defects" had been submitted by the authority, but these were not disclosed to the plaintiff till "discovery" was made in the action. Moreover, the corporation had refused to meet the plaintiff's architect to discuss and settle what repairs were necessary, which, as the judge said, was unreasonable, as no owner should be compelled to repair property without some guarantee that when the work was done it would not be demolished after all; and that any house, provided it is not practically tumbling down, "can" be rendered fit by the expenditure of sufficient money, and the medical officer's report itself showed that what was wrong with these houses was a number of defects obviously of a nature capable of being remedied by the execution of the necessary works. That is not seldom so. Moreover, in other cases it is perfectly possible to convert a house "not fit for human habitation" into a perfectly suitable building for other purposes at less cost than demolition would involve; and in these hard times no property owner willing to do what is needful should be harassed and penalised.

Where a worker or employee is called up for the Army under the Compulsory Military Service Acts, 1916, and so taken away from his work or employment, by the higher power of the State, the contract between employer and employed is at once at an end. The proposition, so put, is obvious: for the performance of the work or service is made impossible any longer. When this happens there is no need for notice on one side or the other. To the plain man this point is quite clear, and now we find that it is confirmed by the High Court in the recent case of "Marshall v. Glanville and Another," an appeal from the Lambeth County Court. This decision will affect many thousands of similar existing contracts. The plaintiff, a commercial traveller, had sued his employers, the defendants, for damages for dismissal without notice. An unmarried man of thirty-eight, he had a contract for service with the defendants made in 1915. Under the Compulsory or Conscription Act he was called up for the Army and joined in July, 1916. He left; no notice was given on either side, but it was agreed that if they had room for him he would be taken back on his return. Somehow or other, the County Court judge found in plaintiff's favour, and gave him six months' commission as damages. On appeal to a Divisional Court of two judges this ruling was reversed with costs, leave being given to appeal further. Mr. Justice McCardie held that the effect of the Conscription Act was to sweep away the arrangement between the parties. After being called up under this Act the plaintiff could not lawfully serve the defendants, and they could no longer lawfully employ him. The contract, therefore, came to an end; it was, in fact, terminated by the State. No notice was necessary, and it was not merely suspended for the uncertain duration of the war. Of course, in a service contract the parties can provide specially for the employee's calling up if they wish. They can also arrange terms when this happens, but that would be to make a new contract. The fact is, that we were so long under the voluntary system of enlistment, to which this decision would not apply, that neither lawyers nor laymen have fully grasped conscription as an Act of the State over-riding the arrangements of individuals.

Two interesting exhibitions opened last Friday at the Leicester Galleries. Lady E. Butler, who leapt to fame more than forty years ago with the "Roll Call," and later with "Scotland for Ever," has a collection of water-colour paintings dealing with incidents in the present war, together with a fine canvas in oils, "Steady, the Drums and Fifes!" depicting the stand made under fire by the Middlesex Regiment—the old "Die Hards"—at Albuera Ridge, in the Peninsula War. There is considerable colour charm in "A V.C. of the Seaforths," and fine grouping in "Eyes Right!"—a regiment marching past a wayside Calvary, but the best in the collection is "The Silent Pipes," a picture of a fallen piper. The other exhibition is a collection of oil paintings by Captain Philip Connard. "Sunshine and Wind," shows a nude bathing child watched by a woman whose figure is silhouetted against a sky full of movement. "The Picnic," with its little group in the foreground, and its trees through which the sunlight streams, is a good colour scheme. So is the portrait, "Helen and James," of a girl and a cat with its black and greens.

Professor Rothenstein, who has been appointed to the newly-created Chair of Civic Art at the University of Sheffield, has sent to the Vice-Chancellor (Dr. Ripper) a statement of his aims and ideals for the advancement of native art and the architectural beautification of the city. He believes that the arts and humanities should demand more attention, and that their encouragement is essential to public well-being. Hitherto, he says, the subject has been almost entirely neglected except that art schools and picture galleries have been provided here and there in order to pay some kind of tribute to its claims. His desire is that definite training should be given to students gifted with creative faculties in order that they may express in outward form something higher and better than that which appears to satisfy our present industrial civilisation. He says it is to cultivate a more fruitful use of the real talents which exist everywhere towards a more generous attitude to other aspects of life than the merely commercial that the work at the newer universities is being undertaken. A great city should express itself in some ways through æsthetic

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beauty and dignity, not merely by showing borrowed specimens of work in a gallery, but in its own buildings, furniture, crockery, metal work, carpets, embroideries, plate, etc. The decoration of public buildings should be the work of local men; the schools, hospitals, and churches should be decorated by local artists, and, once a definite object is given to training in the schools of art, in a decade men and women will be able to perform these tasks for themselves in a way which the purely theoretical and often amateurish training does not enable them to do to-day.

With reference to the Order of the Minister of Munitions, dated May 9, it is notified that the responsibility for the control of the road stone quarries in the United Kingdom taken over under the Defence of the Realm Regulations has been assigned to a special committee as follows:—Chairman, Lieut.-Col. A. St. John Cooke, D.S.O.; vice-chairman, Mr. J. S. Killick, A.M.Inst.C.E.; Mr. P. Dodd, M.Inst.C.E., Capt. J. F. Hawkins, R.E., Mr. W. Jervis, M.Inst.M. and C.E., Mr. H. H. Law, M.Inst.C.E., Lieut.-Col. A. S. Redman, R.E., Mr. H. E. Stilgoe, M.Inst.C.E., Mr. W. J. Taylor, M.Inst.C.E.; secretary (pro tem.), Mr. J. B. Harvey. Road stone quarry owners are instructed to carry on their present operations till June 15, 1917, or till such earlier date by which they may have received any special instructions from the committee. The notice applies to all road stone quarries throughout the United Kingdom of Great Britain and Ireland. Any mine or quarry to which this regulation is so applied shall by virtue of the order pass into the possession of the Minister of Munitions, as from the date of the order, or from any later date mentioned in the order; and the owner, agent, and manager of every such mine or quarry and every officer thereof, and where the owner of the mine is a company, every director of the company, shall comply with the directions of the Minister of Munitions, as to the management and user of the mine or quarry, and if he fails to do so he shall be guilty of a summary offence against these regulations. Possession by the Minister of Munitions under this regulation of any mine or quarry shall not affect any liability of the actual owner, agent or manager of the mine or quarry under the Coal Mines Act, 1887 to 1914, or the Metalliferous Mines Regulation Acts, 1872 and 1875, or the Quarries Act, 1894, or the Factory and Workshop Act, 1901, or any Act amending the same. Any order of the Minister of Munitions under this regulation may be revoked or varied as occasion requires.

"Love," they say, "makes the world go round." The want of it, anyhow, was the impetus which gave us the Bridgewater Canal, which is now under Government control. Francis Egerton, the third, and last, Duke of Bridgewater, about whose sanity in his youth there was grave doubt, fell in love with one of "the beautiful Miss Gunnings." The lady was fond of her sister, with whose name gossip had made free, and the Duke of Bridgewater sought to make it a condition of the lady's marriage with himself that all intercourse between her and her sister should cease after marriage. The lady demurred, and the duke broke off the engagement. She subsequently became the Duchess of Hamilton. He retired to Lancashire, became acquainted with James Brindley, and began the canal from Longford Bridge to Runcorn, connecting Manchester and Liverpool. The undertaking was completed in about ten years, in spite of financial strain. Brindley himself received the princely remuneration of a guinea a week. The opening of the canal diverted Manchester's cottons and woollens from Bewdley and Bridgenorth, on the way to Bristol, to Liverpool, and thus began the great export trade of the latter city. It was said the duke deserved the highest monument Liverpool could give him, but all she has done is to perpetuate his title in the "Duke's Dock."

Our readers who have not yet seen the handsome new volume just issued by the British Reinforced Concrete and Engineering Co., Ltd., of 1, Dickinson Street, Manchester, should send for an early copy. Most of them are familiar with the principle of the system, which has two distinguishing merits. First, that its application consists in all cases of combinations or columns (or struts), beams, and slabs arranged in different ways, the slabs themselves being really beams, but, as a rule, so shallow and so wide that they are differently reinforced from the parts commonly considered as beams. Second, that reinforcements for these different parts of the work consist of materials that are quickly obtainable and conveniently handled, arranged in a way that is simply understood, leaving the least possible work to be done at the site and small room for error. All the B.R.C. reinforcements are machine-made at the works and supplied in the most convenient form ready for fixing in position with the least amount of labour, so that misplacement or subsequent displacement is almost impossible, and the greatest degree of safety is secured. The photographs in the book include a remarkable variety of structures, including churches, institutes, picture palaces, art galleries, palatial business structures, banks, schools, warehouses, etc. Many of these have been erected for some of the leading architects and engineers of the day, and not a few bear ample evidence that with a system like the B.R.C. there need be no sacrifice of beauty of design in the use of reinforced concrete as a material.

Norway's first vessel built of steel and cement, popularly called "the stone ship," will be completed in September.

A meeting of the Council of the Royal Architectural Institute of Canada was held at the Chateau Laurier, Ottawa, Ont., on Saturday, April 28, 1917, at one o'clock p.m., to decide where and when the tenth general annual assembly will be held this year, the creation of the R.A.I.C. Medal, the celebration of the tenth anniversary, etc.

THE ROYAL ACADEMY.

Whether the hanging is better this year because there are fewer pictures, or there are fewer pictures because it was determined to hang those better which were accepted, we do not know. Either way, the result is generally more satisfactory than we ever remember, in spite of the fact that there are no great pictures, and that some rather indifferent ones have been given the best positions.

As last year, the portraits are numerous, and again Mr. W. Orpen, R.A., scores well. Of the half-dozen he sends, those of Lt.-Gen. Sir John Cowans, K.C.B. (213), and Viscount Bryce (286) are the best. The former is in every way a success, the latter almost so, but not quite, though it is difficult to say exactly why. That of Mr. Winston Churchill (160) is not so. There is the characteristic stoop, but the pose is not happily caught, and the nervous facial movement seems exaggerated, much as the music hall mimics exaggerate the peculiarities of the characters they attempt to represent. Lady Bonham Carter (29) has been more fortunate, and Sir John Benn (292) has nothing to complain of. Colonel Elkington, D.S.O. (238), has a vigorously rendered head, but, as in many of Mr. Orpen's portraits, the attire is a secondary consideration, perhaps the more so because khaki lends itself little to colour.

Mr. Glyn Philpot has a good portrait of the Marquess of Salisbury (128), but his other picture, "A Young Breton" (258), is one of the best in the room. The attitude and attire of the peasant youth are so simple, but they show the simplicity of strength, and the figure is so well drawn and the features so excellently modelled that one recognises at once the hand of the master. Mr. J. J. Shannon's only contribution is a very able portrait of Mrs. Whitbread (138), enhanced by a brilliant colour scheme. So is that of Mrs. Morison-Bell (122), by Mr. Lavery, and another of Mrs. Walter Samuel (370). For "The Madonna of the Lakes" (84), a subject picture, we do not greatly care. Mr. Solomon J. Solomon is as prolific with portraits as Mr. Orpen. They include "The Lady Rhondda" (14), "The Late Albert Jessell" (146), "The Lord Rhondda" (178), "Neville J. Woodroffe, Esq." (205), "Owen Parker, Esq." (382), and the "Hon. Lady Mackworth" (389). Mr. Charles Shannon has three portraits, the best undoubtedly that of "Charles Ricketts, Esq." (62). Mr. Reginald H. Campbell has managed to reproduce well the customary genial if quizzical expression of Mr. Birrell (44), and done credit to one of the few leading statesmen who figure this year at the Academy. Mr. A. Hacker is probably at his best with "Martin Harvey, Esq., as Hamlet" (114), though why as Hamlet we do not recognise; anyhow, there is plenty of emotion in the face. Of his two other portraits we prefer that of Albert Brassey, Esq., M.F.H. (366). Mr. Christopher Williams' portrait of Mr. Lloyd George (749) is a not bad blend of that statesman's various qualities as attributed to him by his friends and opponents—now somewhat mixed up together, and doubtless exaggerated by the caricaturists. Mr. Fiddes Watts is creditably represented by "David Thompson, Esq." (142), and "The Hon. Lord Dundas" (664). "The Embroideress" (67), by Mr. Charles Sim, owes more to her dress than to her face, and perhaps the same may be said of Miss D. W. Hawksley's "Joanna" (339). Mr. Richard Jack has two strong exhibits; one a portrait of

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"Major-General Currie, C.B., Commanding 1st Canadian Division" (163), and another, "Miss Muriel Hirst" (665), draped in somewhat daring yellow and black, but quite legitimately subordinate to the charms of face and figure of the subject. Mr. Jack also shows "Richmond Castle, Yorkshire" (241), an excellent riverscape. Mr. Arnesby Brown has a pleasant looking portrait of "The Rt. Rev. Bishop Fisher, D.D. (263). Mr. R. G. Eves has achieved three distinct successes. His portrait of "Job Bradford, Esq." (103) is a most satisfactory presentment of venerable age, and that of Mrs. William Morris (124) is life-like. The third is "The Countess of Hardwick" (173). Mr. Hugh Riviere sends one of the few theatrical portraits, that of Sir Charles Wyndham (341).

There are not a few war-pictures, but comparatively few of them impress us. The best of all—in many respects, to our thinking the best work this year in the exhibition—is Miss Lucy Kemp-Welch's "Forward—the Guns!" (706). It is a real battle-epic in colour, and the struggles of the plunging horses are marvellously well rendered. It is in Gallery XI., and well hung, but it well deserved a leading position in the large room. That, however, has been given to Mr. F. O. Salisbury's large picture of "John Travers Cornwell, V.C.," (123) which has been painted for the Admiralty, a popular reminiscence of the Battle of Jutland. Lady Butler's "The Dorset Yeomen at Agagia, Feb. 26th, 1916," is a characteristically vivid cavalry attack at the battle which sealed the fate of the Turks and the Senussi, who had contemplated an attack on Egypt. Mr. George Wright may be congratulated on "The Victors," in which the cavalry men are seen exchanging cheers with the heavy gunners as they pass them, and brandishing their blood-stained weapons. Mr. J. C. Dollman, who never debauches pathos into mere sentimentality, has two really touching works, "Anno Domini, 1917," (445) and "Fraternitie," (691). A pleasant contrast to some of the blood-creepers is Mr. Fred Roe's "When the Boys Come Marching Home" (687), with the returned soldiers marching through a fruit market. Another well conceived subject, the composition and colour alike excellent, is Miss Flora M. Reid's "Hero-Worship Somewhere in France" (428), with its old woman's motherly attention to a wounded soldier. Mr. Bernard F. Gribble is deservedly well hung with two stirring canvases "The Wrecked Zeppelin" (131), and "News for the Patrol Boat: We Sighted a Submarine" (320). The latter has all the customary vigour of his always welcome sea-scapes. Another fine naval work is Mr. W. L. Wylie's "Battle Cruisers Cheering Ship after the Dogger Bank Action" (338).

The subject pictures range in all varieties from the grotesque to the graceful. Under the first category Mr. Strang's "Youth and Age" (271) is pre-eminent. It is doubtless an allegory; but whether the angel is smitten with the dude in theatre-going attire and a silk hat, or the elderly gentleman in a sage-green dressing-gown is her real favourite tortures should not compel us to hazard a guess. Of very different character is Sir Edward Poynter's idyllic "The Wonders of the Deep" (143), with the charming Athenian children sporting in the sea. This is the President's only work in oil, but he has four characteristic studies in water-colours (790, 796, 802, and 1272). Mr. Charles Shannon's "Incoming Tide" (70), with the women bathing, is good. Mr. George Clausen's nude "Girl Braiding Her Hair" (560) is the best of his five contributions. Mr. Cadogan Cooper's "Our Lady of the Fruits of the Earth" (46) is stagey, and we confess we should have liked the fruits better without the lady. Better of that sort of thing is Mr. Anning Bell's "Titania and the Indian Child" (287). Mr. Edward Stott's "Holy Family" (3) is good. We cannot guess what Mr. Harry Morley's "Seekers of Treasure" (306) are searching for, but we like the colour and design. Mr. Greiffenhagen's "Mermaid" (276) is not an attractive specimen of her species. Two really attractive works are Mr. Tom Mostyn's "An Elegy" (145) and "A Garden of Memories" (202). In the latter the dark figure, on a stone seat of masonry, absorbed in meditation, forms the centre of a really fine picture, the water and the flowers of brilliant hues in the foreground, and the trees behind and around being most skilfully managed. "The Home of the Eagle" (447), by Mr. Sidney Lee, takes up more room than it seems worth. One seeks in vain some centre in the design on which to concentrate attention, and the drawing is rather indifferent. "The Devil's Daughter" (395), by Miss Lindsay Williams, is sensational, but she is of a type hardly likely to tempt men to sin. One of the best of the pictures of the late J. W. Waterhouse, though unfinished, is "The Enchanted Garden" (151), illustrating the well-known tale by Bocaccio. The well-known episode in Rev. xix. 11 is not an unworthy embodiment of "The Triumph of the Word of God" (174), by Mr. Fred. G. Swaish. "Rights of Man" (205), by Miss Anna Airy, is hardly definite; possibly it is an all-round hit at democracy, or is it merely a protest against all real or imaginary rights of the inferior sex?

Landscapes, as usual, afford the best all-round average of interest; and, on the whole, the highest percentage of real merit. Of the very best are Mr. Arnesby Brown's two cattle pieces, "In June" (15) and "White Cattle" (229). Equally good is his "September Morning (233). A small but very pleasant impression of "The Sunny Thames" (574), by Mr. A. S. Cope, should not be missed. Mr. David Murray is as well represented as usual. "Ullswater" (43), "The Sunlit Sea" (51), "Mountain Scenery" (140), "Gentle Autumn Tints: The Glen" (210), "In Lakeland" (218), and "Rain" (522) are all very good. So is Sir E. A. Waterlow's vigorous Alpine scenery in "The Jungfrau" (120) and his "Snowclad Woods" (462). Mr. Adrian Stokes' "Chalet on the Hill" (56) is perhaps his best work, but "The Promise of May" (381) is a good second. Two of the best English uplands are ably portrayed in Mr. Bertram Priestman's "Snow in Buckden Vale" (105) and the "Hillbound Village" (183). "Winter, Hants" (369) is good, and so is "Redbank, Herefordshire" (257), by Mr. S. J. Lamorna Birch. "The Hills of Lorne" (73), by Mr. D. Y. Cameron, with its black ridge contrasting with the fine colour of the hills beyond, is well conceived. Simple in execution, but well illustrating the old saw Mr. G. D. Leslie's "When the oak is out before the ash" (159) is a real bit of natural contrast. Two welcome bits of Australian landscape are "The Murray River" (642) and "Australian December" (261), by Mr. Arthur Streeton, the latter, of course, depicting Australian midsummer. "From Hurt Hill, Haslemere" (373), by Mr. Hughes-Stanton, is excellent, and "Hampstead Heath" (264), by Miss Emily Court, well reproduces one of the best bits of London's best breathing-places. Another well-rendered outlook is Mr. George Clausen's "Winter Morning in London" (492). In the South Rooms Mr. W. E. Riley's welcome water-colour of "Durleston Bay" is one of the best. Of other landscapes of more than average interest are "The Snow Man" (385), by Mr. Alfred Parsons; the "Deserted River" (121), by Mr. Robert Christie; "Picardy" (249), by Mr. R. Gwelo Goodman; "An Autumn Morning at Sheepscombe" (274), by Miss Louise Pickard; "The Pool" (279), by Mr. Harold Knight; "Daffodils" (297), by Miss Winifred Wilson; Mr. Thomas Hunt's "Winter" (346), and "Hangman Hill" (534), by Miss Cecilia Carpmael.

THE SCULPTURE.

The sculpture is generally very commonplace. It is not unseldom so, but in many respects this year's assemblage takes us further back to the last century at its worst than we remember. Certainly the general desire for war memorials and the like has failed as yet to arouse the best efforts of those we naturally look to for them. Possibly about the best is some of that for the Cardiff City Hall, including Mr. F. W. Pomeroy's "Howell Dwa" (1482), Mr. H. Pegram's "Prince Llewellyn" (1503), Mr. Henry Poole's "Giraldus Cambrensis" (1684), Mr. T. J. Clapperton's "Bishop Morgan" (1686), Mr. Leonard S. Merrifield's "Williams Pantycelyn" (1689), and Sir W. Goscombe John's "St. David" (1691). But of neither can it be said that any special claim to rank as statuary of the first order can be acknowledged.

As nearly that as anything in the exhibition is Mr. Paul Montford's "Philosophy" (1490) one half of the group for the Kelvinway Bridge, Glasgow, and nearer still the companion figure of "Inspiration." The latter, let us hope, will more effectually stimulate Scottish energy than the apparently pessimistic meditations of the hoary figure it is to accompany. Mr. Albert H. Hodges' heroic statue of "The Late Captain Scott" (1506), part of the top group of the monument to be erected to the gallant Antarctic explorer, will, perhaps not unworthily, commemorate that brave explorer's fame. As an architectural memorial, Mr. Banister Fletcher's wreathed medallion portrait of his brother, the late Major H. Phillips Fletcher (1580), may claim attention on its merits, quite apart from the brotherly affection which united two of the most estimable members of our profession. Sir Thomas Brock has a fairly good bust of "The Late Edwin Austin Abbey, R.A." (1615), which is to be cast in bronze for the British School at Rome. Sir George Frampton has a memorial relief of the late Sir E. J. Reed (1621) erected in the Town Hall, Cardiff, a memorial bronze of the late W. T. Stead (1608) destined for the Thames Embankment, and "A Wreath of Roses" (1612), part of a memorial tablet. There is a not very satisfactory model of a bronze statue to be erected at Cardiff to the late Lieut.-Col. Lord Ninian Crichton-Stuart, M.P., who was killed at Loos, by Sir W. Goscombe John. Mr. Hamo Thornycroft shows a marble bust of Earl Kitchener (1626), and several other works. Mr. Leonard S. Mansfield has a model of a bronze statue of Richard Trevethick (1668), to be set up at Camborne, good on the whole, but somewhat awkwardly posed. There is a good "Finial for a Newel Post" (1522) by Mr. W. Reynolds Stephens, well and fitly designed. The best panel is Mr. L. F. Roslyn's "The Triumph of Labour" (1557), which is going to Wash-

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ington as part of the gift of the workers of Britain to those of America, as timely an offering as it is well and spiritedly designed. Mr. Alfred Drury, R.A., shows a study of the head for a recumbent statue of the late Father Stanton (1556) for St. Albans, Holborn. One of the best of the small things is Miss Stabler's bust of "The Dreamer" (1516), and she also exhibits a bust in bronze of "The Laughing Girl" (1518).

OVERDOOR EMBELLISHMENTS AND PANELS.*

By HAROLD DONALDSON EBERLEIN.

(With illustrations.)

A doorway is not to be regarded as merely a rectangular or an arched hole through the wall for ingress or egress to or from a room. It is something more than that. It is a dignified and important structural feature deserving emphasis, when opportunity offers, and some grace of adornment compatible with the character of the general architectural setting. Of course, it is not to be expected that all doorways display such dignity, necessarily somewhat formal, but there is usually at least one doorway to any large room where the overdoor space may be advantageously employed for a piece of specific overdoor enrichment.

If one sets out to analyse the *raison d'etre* of overdoor embellishment the answer is to be found in the basic decorative principle which demands the application of ornament upon structural lines or in harmony with some feature of structural significance. Although the average person has been slow to accept the overdoor panel or embellishment because, perhaps, of some lingering mental inertia of the nineteenth century, it is now time to stop laying blame for everything upon the convenient Victorian scapegoat. We need to be more alert, instead, in recognition of the value of devices used formerly, and, in this particular interest, alert to the requirements of the overdoor space and to the manifold opportunities it presents.

The simplest form of lending emphasis to a doorway and dignity to the wall space above it, is to be seen in some of our own early Georgian houses with panelled rooms or halls. In a panelled wall, the bevel flush panel above the door was made to conform in width to the dimensions of the doorway beneath. Of kindred spirit, and only slightly more pronounced in decorative emphasis, were the early Georgian round-arched doorheads with a semi-circular panel, bounded by a moulding surround, above the door.

The next degree of elaboration in overdoor embellishment, for which we have numerous precedents in eighteenth century American work, consists of carved and moulded doorheads, with ofttimes the incorporation of the space immediately above for a relief device, usually of a pronounced architectural nature. As examples, may be mentioned doorheads in the Adam style, with graceful carving or compo details, in the motifs commonly employed by the Adelphi, or with panels, in addition, bearing classic figures, such as those on the modern doorheads shown in one of the accompanying illustrations. To the same classification belong the beautifully delicate creations of Samuel McIntire in so many of the old Salem houses. Simpler, but full of the same chaste dignity, is the treatment accorded to the doorway in the west parlour of the Royal house at Medford, where a narrow oblong panel, flanked by triglyphed imposts resting upon fluted pilasters, occupies the space between the top of the door and the cornice. Belonging still to the same category are the more solid and robust overdoor ornaments, somewhat earlier in date, in the style of James Gibb and Kent, including the straight pediments, broken pediments with central urn, or with more elaborate carved adornments.

The brothers Adam made use of overdoor embellishments with great frequency and in a wide variety of forms. The exquisite doorheads, already alluded to, were but one of the forms they employed. Sometimes, as at Yester House, Gifford (in Scotland), over a comparatively simple door trim they designed a plaster or compo bracket, projecting far enough from the wall to support a bust, and above this, fashioned in plaster as part of the wall ornament, a swag and drops of drapery. Time and again, in their English work, above the doorhead proper, with its finely modelled detail, they placed a painted panel by Zucchi, Cipriani, or Angelica Kauffmann, framed in a plaster moulding whose design corresponded with that of the door trim and cornice. Excellent examples of this type are to be seen in Saltram, Devon, Kedleston; the library at Goodwood House, and various houses in St. James's and Portman Squares, in London. Another device was a narrow, oblong panel between doorhead and cornice, with arabesque motifs of low relief in the plaster, and sometimes accented against the plain background by gilding. Then, again, such panels were occasionally countersunk and coloured a pale green, or pearl or greenish grey, in sharp contrast to the modelled white plaster arabesque. More austere in character, and perhaps most beautiful of all their overdoor devices, were the small plaster medallions and bas-reliefs frequently set in either a large free space or on a shallow countersunk ground, mid-way between the doorhead and cornice. Other methods, too, of adorning the wall space above doors, they devised as circumstances seemed to require, but whatever form the embellishment might take, they gave full recognition to the principle that the overdoor space was a fit subject for dignified ornamentation.

The overdoor carvings of Queen Anne's time were often wrought with great elaboration of design in forms inspired by such master craftsmen as Grinling Gibbon and Cibber. These carvings of fruit, foliage, emblems, and trophies were often undercut and wrought in the round to an extent that made them seem suspended from the points where the top of the swag or drop touched the wall. The same solicitude for the embellishment of the overdoor space can easily be traced back through the seventeenth century and into Tudor times. It is worth noting that, in English domestic architecture, "the internal door and the doorway first became an important feature during the Elizabethan era. The earlier simply moulded surround gave place to doors flanked by pilasters; the doorheads were sometimes lavishly ornamented, the doors themselves freely moulded, carved, or inlaid, and much fancy displayed in their embellishment. This rather free treatment led to the more sober and calculated method of such trained architects as Inigo Jones and others. With the advent of Wren and Vanbrugh, pilasters were superseded by more massive and almost detached columns supporting a bolder frieze and cornice, with sometimes a straight, broken, or semi-circular pediment enclosing a shield or similar decoration of more or less importance."

Passing from English precedents and turning to France, we find the principle of overdoor decoration held in the same esteem. In the time of Louis XIII. the doorhead was often an imposing piece of interior architecture, and during the reign of the Grande Monarque we find highly ornate carved, gilded, and polychrome overdoor panels occupying the space between the doorhead and the cornice. Rich in ornament as the door and cornice themselves were apt to be, the oblong overdoor panel, by reason of its lavish and emphatic decoration, was not seldom the resplendent focus of interest. Even when door and overdoor panel alike were comparatively free of adornment, the latter by its shape and pattern was, nevertheless, a conspicuous decorative item. During the Regence the vogue of the overdoor panel continued unabated, while during the full-fledged Louis Quinze period, with its obsession for decorated panels, we may be sure that no suitable opportunity for overdoor embellishment was allowed to pass unimproved. The florid designs of Watteau and Fragonard seemed especially well suited to such employment.

The more restrained and classic fashion of the reign of Louis XVI. found no less use for the decorative overdoor panel, though, as one might naturally expect, the motifs employed for its adornment were of an altogether different character from those of the preceding stylistic era. With the disappearance of rococo scrolls and curves and the returning predominance of straight lines, the shaped overdoor panel gave place to a rectangular panel, usually either horizontally oblong or square, which became a ground for the display of subjects of classic inspiration. It might be an urn or a vase with flowers in a moulded circle enclosed within a square, a wreathed and ribboned oval in a square, a flat urn with acanthus scrolls in an horizontal oblong or some more important and pretentious motif. The overdoor treatment in the apartment of Marie Antoinette at Fontainebleau is thoroughly characteristic of Louis Seize style. The panes of the doors are lavishly adorned with Pompeian figures and arabesques; the door frame is practically plain save for an inconspicuous egg and dart moulding; immediately above the door are moulded acanthus scrolls, rosettes and a pair of sphinxes; above this ornament is the oblong overdoor panel, framed in a moulding similar to the door trim, showing a classic sacrificial scene in which gods and humans are attended by erotes.

One might go on citing precedents and describing examples indefinitely, but quite enough has been said to show that the embellished overdoor panel enjoyed favour in England, the Continent and America up to the time when the blighting influences of the second quarter of the nineteenth century and subsequently discontinued its use until the present age of revival.

When the tradition of the overdoor panel lapsed from fashion, the only designers who seem to have retained it, and made creditable use of it, were those who worked in the Biedermeier style. It is indeed partly through a modified revival of Biedermeier methods by the modern German and Austrian schools that it has again come into notice. Of course, the comparatively recent return to an intelligent use of eighteenth century English architectural modes was bound to give an impetus to the revival of this dormant feature, and that its employment has been successfully achieved may be judged from the illustrations to this article. The scholarly revival of the French and Italian architectural modes, no less than the English, has also been responsible for the return of the overdoor decoration and in an even more elaborate form.

The subject of the overdoor panel may be suited to any shade of personal taste, whether the individual fancy prefers fruit and flower motifs, symbolical designs, bits of cameo-like classicism or adaptations of old Italian precedents in either landscape or arabesques and conventional design, both of which W. Lawrence Bottomley has used with exceptionally felicitous results.

It is quite true, to be sure, that the interior doorways of houses in the French and Italian styles, derived from Renaissance precedents, are often severely plain and devoid of any vestige of overdoor embellishment, but then, it must be remembered, this austerity occurs with a purpose and not from any poverty of invention. That purpose was not infrequently the subordination of everything else to some spot of concentrated enrichment in the room—it might have been an intricately wrought mantel and overmantel, or it might have been the doors themselves, deeply carved or inlaid with marqueterie or covered with opulent polychrome and gilt decoration. At any rate, the architects of the Renaissance may usually be trusted in such matters, for having a sound reason to back up their practice, and discriminating architects of our day follow them.—"Arts and Decoration."

*We are indebted to our contemporary, the *Decorator*, for the loan of the illustrations which will be found on another page. As the recognised organ of the Decorative arts, our contemporary has unequalled facilities as the channel of communication with American and foreign experts.

The under-mentioned officer of the London County Council has been missing for more than six months, and his death is therefore presumed: Horace Wilfred Lawrance (unestablished assistant, architect's department), private, the Royal Fusiliers (City of London).

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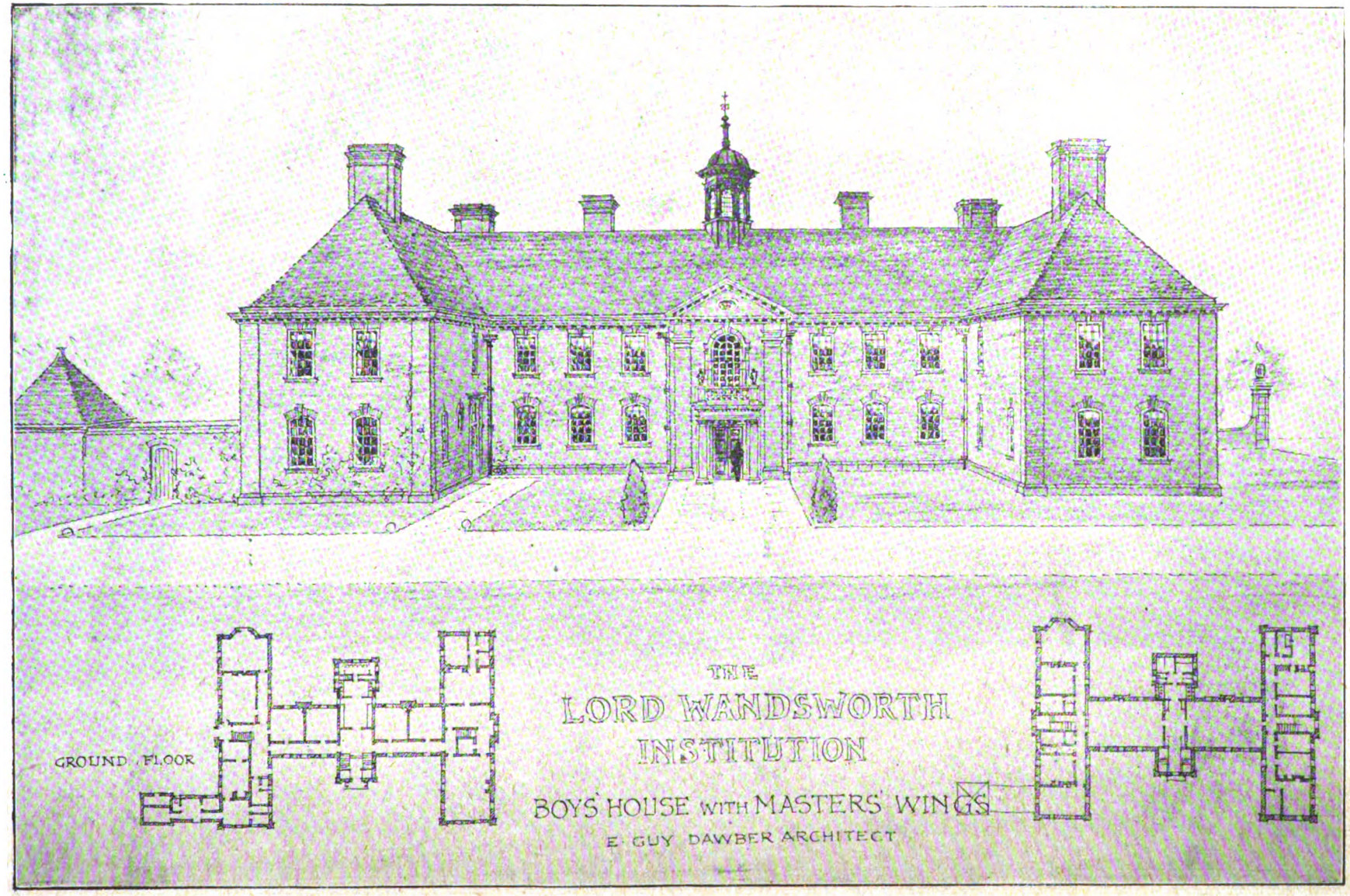

HOUSE FOR BOYS, LORD WANDSWORTH INSTITUTION, LONG SUTTON, HANTS.
Mr. E. Guy Dawber, F.R.I.B.A., Architect.

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Thos. Lewis, Ltd., Photo.]

LUCKLEY, WOKINGHAM, BERKSHIRE.—Mr. Ernest Newton, A.R.A., P.R.I.B.A., Architect.

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Cyril Ellis, Photo.]

THE PRESIDENT'S LODGE, QUEENS' COLLEGE, CAMBE

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E: RECENT RESTORATION.—Mr. CECIL G. HARE, Architect.

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Patriæ Quæsivit
Gloriam Videt DEI
In proud and loving Memory of
Wilfred Herbert Everard Nield
B.A. (Merton College) Oxon.
Lieutenant XI (Service) Battalion
Royal Fusiliers. He fell leading his
men into Action under very heavy fire,
the commencement of the Great Offensive
Movement of the British Forces in the Somme
Valley on July 1. 1916. Elder Son of
Herbert Nield K.C. M.P. & D.L. Middlesex
and of Mary Catherine his Wife
Born at Tottenham Green Feb. 16. 1891
Baptised in this church April 4. 1891
his body is laid to rest in Picardy
God rest his Soul,
a gallant Gentleman.

A WAR MEMORIAL, ALL HALLOWS CHURCH, TOTTENHAM, N.
Mr. MAURICE B. ADAMS, F.R.I.B.A., Architect.

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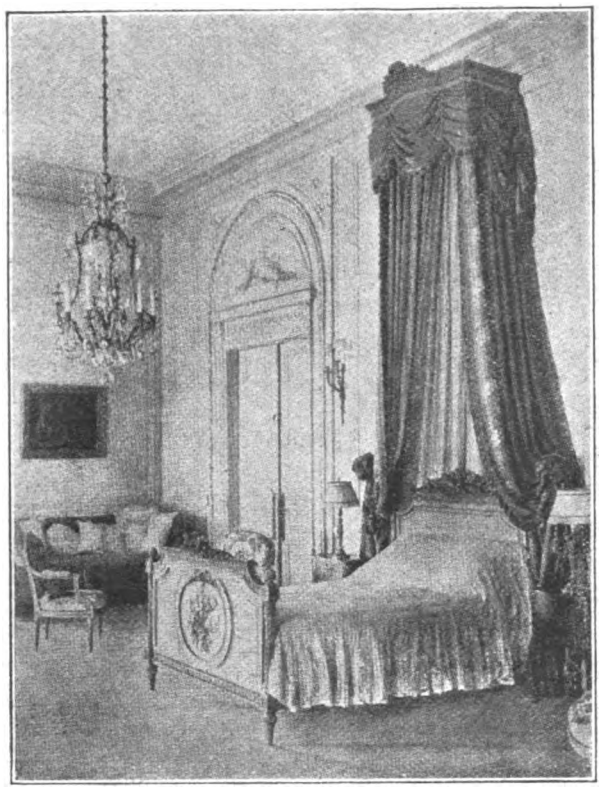
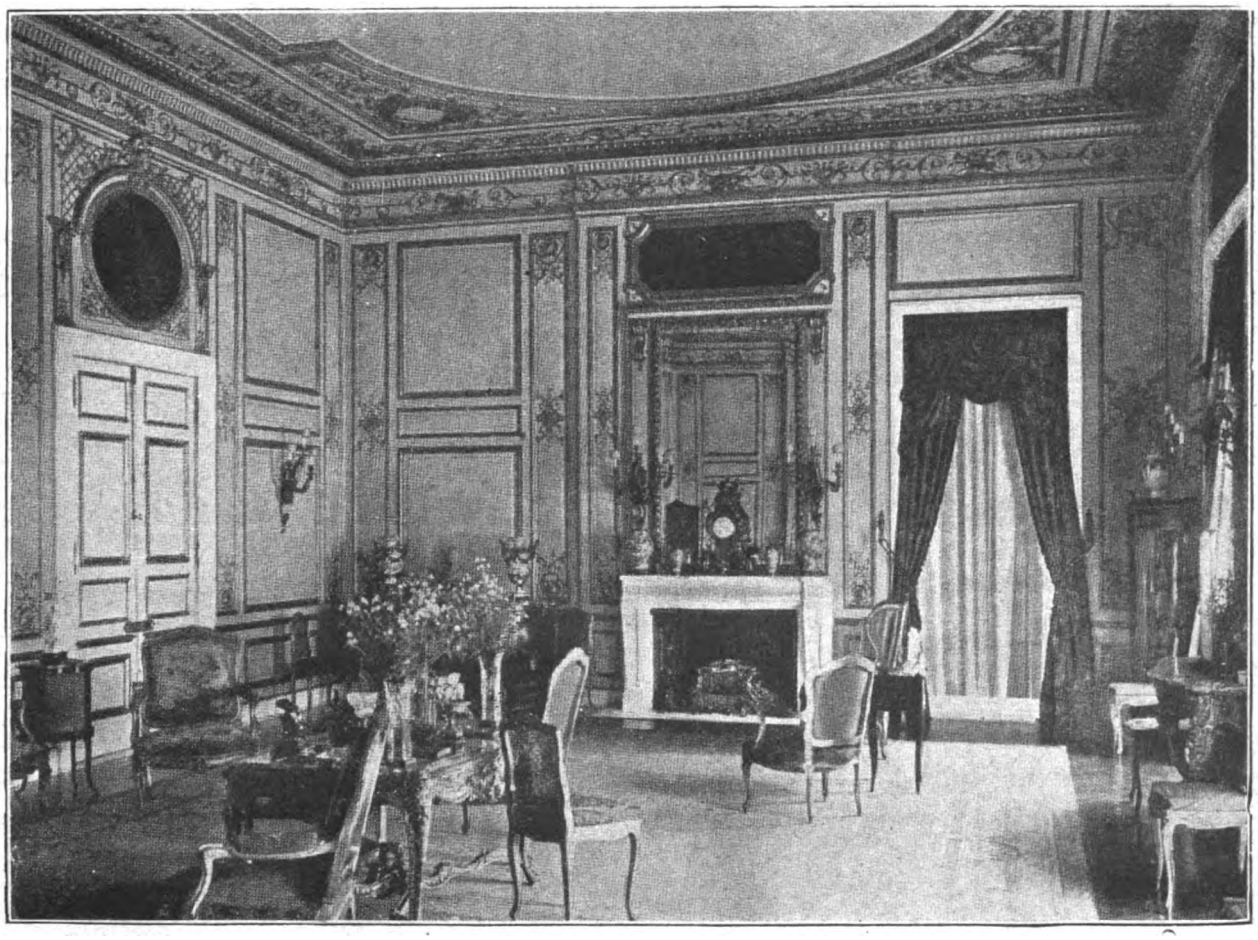


SEMI-CIRCULAR OVERDOOR RELIEF DECORATION IN LOUIS XIV. STYLE.

PANEL DECORATION IN ADAM DOORHEADS.



LOUIS XIV. CIRCULAR OVERDOOR PANEL. SURROUNDING SETTING WHITE AND GOLD.

OVERDOOR EMBELLISHMENTS AND OVERPANELS.

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Our Illustrations.

THE RESTORATION OF THE PRESIDENT'S LODGE, QUEEN'S COLLEGE, CAMBS.

These photographs are now at the Royal Academy Exhibition. The gallery of the President's Lodge is above the north cloister of the Cloister Court and was erected about 1537. The restoration was taken in hand a little while ago and the plaster, with which the structure was at that time covered, was all stripped off so as to expose the half timber work, which was found to be fairly complete. The upper range of windows had been covered up, and on re-opening these the original old glass was found and carefully preserved in situ. The octagonal bay in the centre was supported on piers of modern brickwork—these were removed and replaced by oak columns, and during the course of this alteration the foundations of the original columns were found and proved to be practically of the same diameter as the new ones. The uprights of the half timber work are entirely the old ones, but it was found necessary to splice them at their feet, which had decayed. The moulded beam at the bottom, the moulded string course and the coved eaves are new, as are also the carved pieces in the central bay, which were introduced to give a little relief to the formality of the remainder. The oriels at either end were originally surmounted by wooden spires, but after consideration it was decided not to replace them. The work was carried out by Mr. William Sindall, builder, of Cambridge, the architect being Mr. Cecil G. Hare, of 11, Gray's Inn Square.

LUCKLEY, WOKINGHAM, BERKSHIRE.

The photograph reproduced to-day of this house is now on view at the Royal Academy Exhibition. The building was carried out for Mr. E. N. Mansfield on an old garden site. The walls are of Chichester clamp bricks of varying shades, with dressings of deep red kiln bricks. The roofs are covered with deep red hand-made Wrotham tiles. Mr. Ernest Newton, A.R.A., F.R.I.B.A., is the architect.

A WAR MEMORIAL. ALL HALLOWS CHURCH, TOTTENHAM, N.

Last Saturday, the 12th inst., this memorial tablet was dedicated by the Bishop of Southwark. It has been erected in Tottenham Parish Church to the memory of Lieut. Wilfred Herbert Everard Nield, B.A. (Merton College), Oxford, elder son of the Recorder of York, Mr. Herbert Nield, K.C., M.P., D.L., Middlesex. This gallant young officer lost his life leading his men under heavy fire on July 1, 1916, at the commencement of the great offensive of the British forces on the Somme, and his body is buried in Picardy. The heraldry on the alabaster escutcheon is gilt and silvered and tinted in correct colourings. The family arms occupy the red shield at the top of the frame above the gold grenade of the Royal Fusiliers. On the left hand appear the Merton College arms in recognition of his Alma Mater. His regimental badge is carved on the right. More is made at the base of the arms of Winchester College, including the episcopal mitre of William of Wykeham, the founder, with "Manners makyth man" inscribed on the garter. The tinted Tudor roses on the silver shield add colour, "W. W." being placed to the right and left, with suitable mantlings. The prominence given to this feature in the design is befitting by reason of Lieut. Nield's love of his school, where he did so well and made many friends. The Bishop of Southwark was his headmaster. The Tudor rose is repeated in the alabaster ornamentation, which was advisedly worked out on Stuart lines, mainly on account of the site chosen for the tablet being immediately contiguous to the big tomb of that period situate in the north aisle of All Hallows' Church. This monument was erected in 1664 to the memory of Maria Wilcocks, wife of Sir Robert Barkham, with half-length effigies designed by a sculptor named Edward Marshall. The knight is in armour and the lady in lace stomacher and veil, her hand holding a skull. Three sons figure below and seven daughters, their connection being commonly associated with "the seven sisters" of Tottenham and seven elm trees, which gave the name of Seven Sisters to one of the main roads of North London. The scheme is florid and rather coarse in treatment; consequently, with such a near neighbour, this smaller memorial had to be correspondingly large in scale of handling in order to insure a proportional relationship and enable the Nield tablet to hold its own in the church. The lettering is made to form an integral part of the decorative contrivance, and was drawn out full size by the architect, Mr. Maurice B. Adams, F.R.I.B.A., of Chiswick. The work has been admirably done by Messrs. Farmer and Brindley. The convex cartouche panel is in white statuary marble and dead-black mastic letters. The Church of All Hallows, Tottenham, had a varied history, with many changes. It is particularly picturesque at the west end, owing to its old tower and Jacobean south porch in brick, with a room over parvise fashion to big scale. The building is very mixed in style and of differing periods. The chancel, vestries, and quasi-transepts were added in 1875 by William Butterfield, who used bright-red bricks and stone traceries. He considerably altered the interior, and put some very poor stained glass in the windows. There is a fine organ. He was buried in the graveyard situated to the north of All Hallows' Church in 1900.

HOUSE FOR BOYS, LORD WANDSWORTH INSTITUTION, LONG SUTTON, HANTS.

We gave two drawings last week of this building erected by Mr. E. Guy Dawber, F.R.I.B.A., the architect of this great agricultural education establishment. These perspectives are now at the Royal Academy. The plans with this front view will explain the arrangements and our previous description furnish further details of the undertaking and of these premises in particular. The accommodation includes wings for Masters and Matron respectively, one at either end.

OVERDOOR EMBELLISHMENTS AND PANELS.

The description of these three interiors will be found in Mr. H. D. Eberlein's paper given on p. 416.

OBITUARY.

We regret to record that Captain and Adjutant Roby Myddelton Gotch, Sherwood Foresters, wounded and missing on July 1, 1916, is now believed killed. He was born in 1889, the only son of Mr. J. A. Gotch, J.P., F.R.I.B.A., F.S.A., and Mrs. Gotch, of Weekley Rise, near Kettering. He was educated at Cottesmore School, Hove, Rugby (School House), and New College, Oxford, taking his degree in Law, 2nd Class Honours, in 1911, and in the following year passing for the B.C.L. (3rd Class Honours). On leaving Oxford he was articled to Messrs. Thorpe and Perry, solicitors, of Nottingham. While at Rugby he gained his "cap" at football, and during the winter of 1913-14 played for the Harlequins. He was a member of the O.T.C. at Oxford and at Nottingham, and joined the Sherwood Foresters as second lieutenant. He went to the front in February, 1915, was gazetted temp. captain on July 5, 1915, and adjutant a few days later. He was mentioned in the despatches of January 1, 1916, and at the time of his death his name had been recommended for distinction. Early in the advance of July, in the midst of a terrible barrage, close up to the German barbed wire, he was wounded in the wrist, but went to the help of his runner, who was in difficulties with a telephone wire which he had volunteered to lay. Captain Gotch stooped down to assist, when he was again wounded, it is believed mortally. His brigadier-general wrote of him as "one of the finest officers in the brigade."

The death took place last Friday, at his country house, The Lee Manor, Great Missenden, of Sir Arthur Lasenby Liberty, the founder and chairman of Liberty and Co., Limited. Sir Arthur was the eldest son of the late Mr. Arthur Liberty, a lace manufacturer, of Nottingham, and was born at Chesham in 1843. Educated at the University School, Nottingham, his business training began in 1859, and in 1862 he became manager of the Oriental Warehouse, formerly in Regent Street, where he became permanently acquainted with the leaders of the art world of the day, many of whom were among his friends. In the spring of 1875 he made his first venture on his own account. Beginning with half of a house in Regent Street, his business expanded year by year until it reached its present dimensions. One of his most notable achievements was the introduction of dyes supposed to be a secret of the East, and this led to the popular appreciation of the range of delicate tints now known as the "Liberty colours." In 1894 the business was converted into a limited company, but during succeeding years Sir Arthur kept a guiding hand upon it. In 1913 he received the honour of knighthood in recognition of his services to the applied and decorative arts. On that occasion he was presented by the staff with his portrait by Mr. Arthur Hacker, R.A. Sir Arthur was a magistrate and Deputy Lieutenant for Bucks, and High Sheriff for the county in 1899; he was a juror at the Paris International Exhibition in 1900, a member of the London Committee of the Milan Exhibition of 1906, a member of the Royal Institute, a Fellow of the Asiatic Society and of the Organising Council of the Japan Society, and Chairman of the Advisory Committee of the Royal School of Art Needlework. Shortly after beginning business on his own account, Sir Arthur married a daughter of the late Mr. Henry Blackmore, of Exmouth, Devon. The funeral will take place at The Lee Church, Great Missenden, to-day, at 3.15 p.m. We gave an illustration in our issue of May 15, 1914, of the bust of Sir Arthur, executed by Sir George Frampton, R.A., and exhibited that year at the Royal Academy, which was subscribed for and presented by the textile manufacturers of Great Britain and the Continent. He had indeed well deserved the general recognition his efforts received, for as Norman Shaw wrote to him: "You have put your mark on your time—like Pugin, Whistler, and fortunately some others. You found things—most of 'em beastly, and you leave them glorious in colour and full of interest. What more could you desire? What more could anyone desire? It is the fashion nowadays to run down Commercialism! but I don't see it—it is only when Commercialism is bad, and associated with bad Art, that it is objectionable; in other respects it is good and right, and a good backbone."

Oil stains on concrete floors may be removed by using a mixture of 1 lb. of oxalic acid in 3 gallons of water, with enough wheat flour added to make a paste that can be applied with a brush. Allow the application to remain for two days, and then remove it with clean water and a scrubbing brush. A second application may be necessary in stubborn cases.

Mr. J. C. H. Hartley, elder son of Mr. T. H. Hartley, borough engineer and surveyor of Colne, has been gazetted second lieutenant in the Loyal North Lancashire Regiment. Lieutenant Hartley received his training in the Inns of Court Officers' Training Corps and afterwards in an officers' cadet unit. Previous to joining the Army eighteen months ago he was a pupil in the Colne Borough Surveyor's office.

The Army Council have issued an order restricting the sale of Russian timber. No timber bought in Russia before January 1, 1917, is to be sold or offered for sale otherwise than to the Director of Timber Supplies or to persons authorised by him. The price is not to exceed by more than 10 per cent. the price at which the owner bought it. The order does not apply to any timber now in stock in the United Kingdom.

The Secretary of the War Office announces that the Army Council have taken possession of all stocks of imported soft wood held by merchants and agents in the United Kingdom of 250 standards and upwards. Stockholders are required to make a return of such stocks to the Government timber buyer, Mr. Montague Meyer, Palmerston House, E.C., on a form which may be obtained from the Director of Timber Supplies, A.D.T.S.I., Caxton House, Tothill Street, Westminster, S.W.1.

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FOLK MUSEUMS.

Before the Hampstead Scientific Society Mr. G. R. Carline, F.R.A.I., read an interesting paper on "Folk Museums," tracing their history, and advantages.

The lecturer asked one to suppose that there were erected in suitable surroundings typical examples of buildings of bygone days from different parts of this country. Then, as one walked about the grounds, one would see the pages of Green's "History of the English People" or Traill's "Social England," illustrated with living pictures. One would feel that, on entering, a fairy had taken one back into the past centuries, and one saw the people at home, the houses they lived in, and the mode of their life and thought at different stages of the country's history; and, as a Swede has put it, when speaking of his own museum, it would be "as though we heard the quiet rhythm of a mighty song, the song of a people telling of the generations that have gone, and the days long since reckoned with the past."

These museums originated in Scandinavia, the first at Stockholm, the second at Lund, the next important one in Norway at Christiania, and the fourth at Lyngby in Denmark. Though Sweden has about fifty such open-air museums, outside Scandinavia it is mainly in Germany, Austria, and Russia that the idea of this type of Folk Museum has found most welcome.

He proceeded to show the "evolutionary sequence" of this idea as seen in Great Britain, completing the series with the fuller idea seen in Scandinavia. Apart from the mere collection of folk objects and "bygones" arranged systematically, and which he was not dealing with in his paper, the first stage towards a Folk Museum is the reconstructed room or interior, showing the conditions of life of a particular class at a particular time. Thus, at Wilton-park Museum, Batley, in Yorkshire, is an "Old Interior" which contains what may be described as folk collections, and illustrating the life of people in past times, the idea, however, being not so much that of associating objects all strictly of the same period, to exemplify some particular phase of culture-history, as to bring together sundry out-of-date objects and to display them as far as possible in familiar surroundings. In the Northampton Museum is an "Old Shoemaker's Shop" to show the stage and condition of the shoemaking industry of the town in the early part of last century. At Wellcome Historical Medical Museum, London, there are several reconstructed interiors, illustrating the history of medicine. In all these cases, except in one case at the latter museum, they are imitation rooms. Similar examples to these may be seen on the Continent, as, for example, in the Museum of Applied Art at Düsseldorf.

The next stage is when the room is reconstructed of original old material, possibly from different houses, as at the Castle Museum, Norwich, and seen in the two panelled rooms, a Jacobean and a Georgian, showing "Norwich through the Centuries." Then comes the entire room preserved as is mainly the case in the Victoria and Albert Museum. A further stage is where an old house is preserved and furnished (or partly furnished), appropriately for the period. Of this there are several stages. At Hull, in William Wilberforce's House, now one of the Hull Museums, is a Georgian room, showing a typical room of the period, though not furnished as the preceding examples, and containing a few show cases. At Ipswich there is a fine old mansion, the Art Gallery of the Museum, in which is shown the typical old kitchen, but the most is not made of this fine old house. At Norwich, again, there is the "Stranger's Hall," dating back in part to the fourteenth century, a private house belonging to, and lived in by, Mr. L. Bolingbroke, who has fitted and furnished it as a Folk Museum. Similar to this type are the houses of eminent and famous people, as Shakespeare's house, the Dickens Museum at Portsmouth, Wordsworth's house in the Lakes, etc.

Lastly, for England, is the Hall-i'-th'-Wood, near Bolton, an old Lancashire house, dating back to the end of the fifteenth century, in which the rooms are furnished appropriately according to the date of the room. This is the first Folk Museum in England, and, though a wonderful museum, it is small and incomplete when compared with the great museums of Scandinavia. In this "evolutionary series" many similar examples were shown from Continental museums.

Proceeding then to Scandinavia, he showed the completer idea, commencing with the first and foremost of these museums, the "Nordiska Museet," of Stockholm, with its open-air part known as Skansen. This museum was originated and founded by Dr. A. Hazelius (1833-1901), who wished to show all the phases of national life, more especially of the peasantry, and whose idea was not merely a museum in the ordinary sense of the word, with showcase after showcase, but a place also where every object should be in its proper atmosphere, conditions, and surroundings as near as possible. It was with this idea that the first room-interiors arose. In other rooms and galleries of the museum objects are displayed in ordinary museum methods, as is also the case in the well known Musée de Folklore at Antwerp. But "Why stop at interiors with lay figures?" was Hazelius's natural question: "the buildings themselves are worthy of preservation;" and so later, when the suitable land was obtained, the picture of Scandinavian life thus represented was supplemented by the Open-air Museum at Skansen. Old and interesting buildings were re-erected, and in most cases saved from destruction, the lay figure being replaced with real life. Here then, at Skansen, these ancient cottages and larger houses have been re-erected with careful attention to accuracy in detail, furnished originally, and fitted with all appropriate utensils. Farm buildings and various other outdoor relics of past ages have been placed in appropriate surroundings, as a Lapp encampment, a mean stone cabin, a militia-man's dwelling with cow-house and granary, a blacksmith's shop, lumbermen's temporary cabins, moving boothes, mills, belfries, tar boiler, pigsty, grave crosses, runic stones, stocks, maypole, and numerous other objects. All are exactly as they were when they served the every-day needs of man on their original sites. The local fauna and flora is also represented, as they are important elements in which Scandinavian characteristics have developed. To show the life more fully, a platform for dancing has been prepared in the open in order to show, and to create an interest in, the old Swedish customs and dances, and in order to keep fresh the memories of great historic days. Certain fêtes are held every year, when characteristic country dances, songs, and games take place; these all harmonise well with the surroundings and the governing principles of the museum. Concerts with old music and saga-plays are also given.

In comparing Skansen with some other Scandinavian museums, one notes the absence of any representation of burgher or aristocratic life, such as is seen at Lund and Bygdö (the museum at Christiania), which have been arranged on a more definite plan, the latter being divided into two parts, one part town and the other country. The lecturer described in some detail the museums of Bygdö at Christiania, Lund founded by Dr. G. J. Karlin, Lyngby, near Copenhagen, the Sandvig Collection at Lillehammer in Norway, and others. It was seen in all cases that the ruling principle is to show the development and history of a particular people either of a large area or a small one, a particular class, or all classes. What, he asked, is more interesting than one's own history, the advance of the country from its childhood, and to see the vicissitudes of its past? From all this one gathers and learns much that bears on the problems of the present, and that teaches us lessons for the future.

The death of Major Alastair C. B. Geddes is announced, killed in action, the elder son of Professor Patrick Geddes, architect, of Edinburgh, the well-known authority on town planning, who is at present in India.

An artificial stone recently patented by E. O. C. Howells, Haynstone, Stoke Park, Coventry, is a mixture of about four parts of granite and one part of Portland cement, to which is added about 10 per cent. of Bessemer steel slag.

COST ACCOUNTING FOR THE CONTRACTOR.

Every contracting organisation must have a cost system of some sort, however crude. A hit-and-miss plan never works successfully. Any cost system, however, is valueless unless used by the entire organisation, and a contractor who is not prepared to make his costs open and accessible is almost as well off without a system at all. This idea was brought out by Leslie H. Allen in a paper read at the recent meeting of the American Concrete Institute. His paper, abstracted below, discusses the essential features of a good cost system for contractors and shows how such a system may prove of valuable benefit.

A system of cost accounting to be of any value to a contractor must have its data accessible to and understood by everyone in his organisation who has anything to do with costs. It is valueless if it is kept a secret. A proper system of cost accounting may be likened to an expensive tool or machine—of great value when working, but an unjustifiable expense if kept idle most of the time.

The contractor who thinks that his unit costs are a trade secret, and that the circulation of information regarding his costs will do him an irreparable injury, is making a great mistake. If his costs are higher than his competitor's these competitors will lose business if they use them. If his costs are lower, competitors will lose money if they use them. It is efficiency and not cost data that makes for low costs. The cost data simply point the way to efficiency and show the failures to reach it. For this reason the writer's firm has not hesitated to make public its costs at any time. We feel that if we make lower costs than our competitors it is because we have the men and the brains needed to do it. Others cannot equal our costs simply because they know them. On the other hand, if our costs are higher than they should be no one gets from their publication any valuable information that can give them an advantage.

COST SYSTEM STIMULATES INTEREST IN WORK.

Very many contractors have the labour costs distributed by a timekeeper and worked up in his spare time by the bookkeeper, and the results are only seen by the boss. Neither man understands his work or can show any enthusiasm for it. The opposite of this is the case on our work, and it is sometimes quite embarrassing to the writer to be called upon to adjudicate in cases where knotty points are being discussed with great earnestness by our timekeepers and foremen, such as whether repairing forms damaged by the strippers should be charged to stripping, erecting, or making. The fact that such interest is shown in minor points indicates a real interest in efficient work and low costs all down the line.

The concealment of cost data is one of the reasons why it is so difficult to get accurate results. No employee can take intelligent interest in work which is meaningless to him. The contractor's problem in any system of cost accounting is not to so conceal the costs that no one but the boss can get them or understand them, but to make them accessible to and understood by the greatest possible number of people in his organisation. The more people he can educate to understand cost analysis in his organisation, the more intelligently and sensibly is his work going to be handled. Not only this, but it is very desirable that the architect or engineer should have some idea as to the costs of the work being done by the contractor under his direction.

COST SCHEME SAVES MONEY.

There occur to the writer's mind incidents on construction work performed by his firm where the engineer's knowledge of what the work was costing has led him to allow modifications in the design which have saved much money for clients, whereas if the cost accounts had been concealed suggestions and arguments regarding a change in the design would have gone unheeded. For instance, on a recent job where the depth of column footings varied, owing to bad ground, the engineer desired to build all footing the same thickness, and to start all columns at the

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same height and to make up the different depths between top of footing and bottom of column by pyramids of concrete, each one of which, of course, would need separate forms of varying shapes. Instead of arguing on a matter of opinion we were able, after building two or three, to demonstrate that this method was much more expensive than putting additional concrete into the footings, and we were allowed to make the change.

There are five essential features of a contractor's cost system:—

First, the estimate.—(a) An estimate for each job is made, based on the costs of earlier jobs of similar nature. (b) This estimate should be analysed to show first the quantities, unit costs, and total costs of each item of labour, and then the quantities and estimated prices of each item of material and each sub-contract.

Second, a daily labour cost report showing the labour costs of each day's work.

Third, a weekly labour cost report showing in parallel columns the estimated and actual quantities, unit costs, and total costs of the work performed.

Fourth, a monthly statement of the cost of materials and sub-contracts purchased or ordered, showing in parallel columns estimated and actual costs.

Fifth, a final summary made at the close of the job showing the total cost of all labour and material.

ESTIMATE A SOURCE OF VALUABLE INFORMATION.

In many offices the estimate is locked up in the safe the day the contract is signed, and never sees the light of day again. The estimate is, or should be, the result of the estimator's study of cost data on preceding jobs, and is therefore the standard set for the cost of the job for which it was made. With it daily labour costs and material purchases should be compared. It contains much valuable information that is most useful to, and should be made use of by, the contractor's force. In order that it may be of the greatest possible use it should be in sufficient detail to show in separate items the various kinds and classes of work done by different gangs, and it is best to make an analysis of the estimate into two main divisions:—Labour; material (sub-contracts and all items not classed as labour). The total of the first division therefore gives the estimated total pay roll, and shows how it is expected that this will be spent upon carpenters, masons, labourers, etc. The second division shows in detail the quantities of material, sub-contract work, etc., item by item.

Who should see and use this valuable information and work to these standards?

First, the general superintendent, as it gives him a standard of performance by which he can measure his job superintendents and foremen. It tells him more in a few minutes about the supply of materials and sub-contracts than would a day's studying of the plans, and in general is a big help to him in supervising the employment, supply of material, progress, etc.

Second, the job superintendent needs more than anyone to see the estimate. From it he can see what the firm expects him to accomplish in the way of costs, and his criticisms of the estimate should prove helpful to the estimator. With it he can confer with the purchasing agent of the company and with the local dealers from whom he has to buy supplies, and without a lot of computation on his part he can place the orders for much of his material. From the sub-divisions of the analysis he can determine the sort of organisation that should be placed upon the work, how many carpenter foremen, how many carpenters, the size of the labour gang, the number of mechanics, etc. Reading the estimate will call to his mind all the work that has to be done. The estimate shows him the quantities of materials he has to receive, and he can plan for their efficient storage.

Third, the purchasing agent. From the material section he prepares a more detailed schedule, and by taking dates from the progress schedule he can prepare for his own use a list showing all materials required and the dates required in order that he may start in buying intelligently and see that everything is delivered on time. He has a valuable check on the bids received.

Fourth, the scheduling men also should receive the material section of the estimate and check their quantities by it. From the purchasing agent they receive notice of the dates these schedules are required in order that he may buy them and have them delivered at the job in time.

Fifth, the foremen of brickmasons, carpenters, concrete gangs, etc., should be told what are the estimated costs of their work, and shown from week to week how their work compares with the estimate.

DAILY LABOUR COSTS EFFECTIVE.

The second important feature of a cost accounting system is a daily report of the labour costs. These are best prepared on the job, and should be in the job superintendent's hands by 9 o'clock the next morning. If each carpenter foreman is told what are the estimated costs on the operations he is performing and is notified every day as to whether he is keeping within or overrunning his costs, it is sure to have its effect. We frequently plot the principal items graphically on a chart which not only the foremen, but the workmen, can see as they check in and out. The lowest labourer takes a cheerful and even enthusiastic interest in the vagaries of the wandering line that shows the cost of the work he is doing.

It is best to keep the cost accounts on the job instead of in the head office. Costs to be of any use should be fresh, not stale. If the superintendent knows at 9 o'clock the very next day that concrete costs 20 cents a yard more to put in than on the preceding day, he can talk it over with his foreman while the matter is fresh, and investigate and remedy the fault; but if the news does not come to him until a week or ten days after the work in question is done, it is too late to do anything. It is not necessary to have these daily cost reports go through the main office in any case, as they come in too often and contain too great a mass of detail to be of much benefit to the general superintendent. The daily costs point out to the job superintendent an occasional high spot that he has missed, and are an unfailing barometer of the job.

WEEKLY LABOUR REPORT.

The third essential of a cost system is a weekly labour report. This should show in parallel columns the estimated and actual quantities, unit costs, total costs, and saving or overrun. The amount of detail may vary in different organisations, but should be sufficient to give an intelligent account of the operations. This statement should be furnished to officers of the company as well as to the job superintendent. For the benefit of the former the main facts can be condensed into a very few items by the use of a simple summary. This statement gives a sort of review of the job's operations to date. It should go to the general superintendent and the estimator in the head office. The latter particularly needs to know the fluctuations in costs in order that he may check up his judgment with actual facts and learn the costs of any new sort of work.

MONTHLY LABOUR COSTS.

The fourth essential feature of a cost system is a monthly report showing in tabular form the estimated and actual costs and quantities of the materials, and amounts of sub-contracts and other expenses incurred. By adding together the savings or overruns on the labour and materials the contractor can tell every month just how far behind or ahead of estimate his job is, and can make an intelligent forecast as to how much can be saved or will be lost on the remainder of the job. Such information is rarely to be found in a contractor's office, but is of great value to him, and in itself is worth almost all the time and expense that should be put in on a cost accounting system. This statement should, of course, go to the job and general superintendents who are using the materials, to the purchasing agent who spends the money, and to the estimator, who finds it a most valuable check in his work.

FINAL SUMMARY GAUGES FUTURE WORK.

The fifth essential feature is a final summary of the job costs made up in the same form as the original estimate, which should be filed for future use. A copy should be given to the job superintendent as a record of what he had accomplished, and to the general superintendent as a permanent reference for him, in order that he may have something to judge by in his criticism of future jobs. The estimator should have a copy, as it is his chief authority for prices he places upon new estimates.

THE ITALIAN ORDERS OF ARCHITECTURE.*

There is very good value for the money in this well-printed and illustrated book, which has been prepared by Mr. Charles Gourlay, Professor of Architecture and Building in the Royal Technical College, Glasgow, for use as a text-book for beginners, as well as a reference book for architects, and by craftsmen when executing work. The illustrations, of which there are thirty-two plates, are naturally the most necessary parts of the volume. They have been wisely left in outline, and are thus clear and easily read. They include, first, the proportions and forms of the Five Orders in plan, elevation and section; next, the details of their mouldings to a large scale; and, lastly, such other relative matters, including pedestals, imposts, archivolts, balustrades, doors, and windows, as are required when designing any composition based on the Orders. The plates are well drawn and printed, and show clearly the details of all the mouldings and such parts as are generally of an obscure nature.

The descriptive matter, though condensed, is ample, and comprises a short but adequate summary of the nature, origin, and characteristics of the Orders. Then follow a few pages of instructions how to draw them; and, lastly, a description of the plates. The volume, we are told, is the outcome of preparation which has extended over many years, and the author's long experience as a teacher and his frequent visits to Greece, Italy, France and England. We congratulate him on his success, for it is certainly the most practical and businesslike manual of its subject, at its price and within its limits, we have ever seen, and recommend it to all concerned.

TRADE NOTES.

Boyle's latest patent "air-pump" ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64 Holborn Viaduct, London, have been employed at the New War Hospital, Union Buildings, Chester Road, Sunderland.

The basement of the Masonic Hall at Grimsby, which was a continual source of trouble owing to flooding after heavy rains, has now been remedied with waterproofed cement. The makers of Pudlo (the waterproofer used) will be pleased to give advice to any interested readers on making watertight any structure which may be subject to dampness or flooding.

Four drawings by Alfred Stevens, including the study for "Daniel" at St. Paul's Cathedral, brought £78 (Carfax) at Sotheby's last Thursday.

Second Lieutenant Henry Edward Otto Murray-Dixon, who was born in 1885, was the eldest son of the Rev. J. and Mrs. Murray-Dixon, of Swithland Rectory, Leicestershire. His life was devoted to artistic pursuits and natural history, and he attained a high position among the bird painters of this country.

Middlesbrough Town Council has decided to reduce the net price of gas from 2s. 2d. to 2s. per 1,000 ft. This is due to a scheme by which waste gasses from coke ovens at the local ironworks are utilised for illuminating purposes. A good example, which might be followed elsewhere but for the obstructive tactics of some gas undertakings.

The following mixture has been used by United States Army Engineers in waterproofing concrete:—One part cement and two parts sand, with ¾ lb. of alum per cubic foot. This is mixed dry and water added in which ¾ lb. soap per gallon has been dissolved. It is claimed that this mixture is not only impervious to water, but prevents efflorescence.

* The Italian Orders of Architecture, by Charles Gourlay, B.Sc., A.R.I.B.A. London, Edward Arnold, 41 and 43, Maddox Street, W. 6s. net.

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Our Office Table.

The War Losses Commission dismissed on May 8, so the *Times* says, a claim for £172 against the War Office by Mr. R. C. Gould in respect of an old Jacobean house in Sussex, which was occupied by the military from November, 1914, to February, 1915. A sum of £301 had been received for billeting, and the claim was for dilapidation, the claimant declaring that parts of the oak panelling and a number of doors had disappeared and several trees had been cut down. For the military, it was maintained that the troops destroyed this woodwork because they had not been supplied with sufficient coal. The claimant replied that it had been difficult to obtain coal, and that twenty tons at £2 a ton were supplied.

The Forest Products Laboratories of Canada, established at Montreal by the Department of the Interior, in co-operation with McGill University, have undertaken an investigation of the woods of the different species of the trees in Canada, so that reliable and authoritative information may be available. The only Canadian species in regard to which fairly complete information has been obtained is Douglas fir, but as there is a special interest at the present time in regard to structural timbers, particularly in a comparison between Canadian and foreign timbers, it has been considered advisable to issue a preliminary study on structural timbers, using the information now available from many sources and particularly the results of investigations made at the laboratory of the Forest Service of the United States. This preliminary report, entitled "Canadian Woods for Structural Timbers," is now being distributed by the Department of the Interior as Bulletin No. 59. It will be found that Canadian timbers rank high for structural purposes. The results of an exhaustive series of mechanical and physical tests of Douglas fir made at the Forest Products Laboratories of Canada are now in course of publication, and similar tests of other important Canadian woods are in progress, the results of which will be published as soon as they are available.

The Bishop of Truro, writing in his diocesan magazine, says: "Many faculties are being applied for for the erection of memorials to those who have fallen in the war. I wish to urge that it would be far better to wait till the war is over, for three reasons: (1) Labour ought not to be employed on unnecessary work until the war is finished. (2) So much money ought not to be spent on what does not, even indirectly, help the nation forward in its life and death struggle. (3) It is very undesirable that church walls should be covered with a number of tablets. And in most cases it will be much better to have a single war memorial in the parish. It is difficult to refuse a faculty; but, in my opinion, it should not be applied for."

The Queen, moved by her knowledge of Indian conditions and her deep interest in the lot of the Indian women, has sent to the widows of the soldiers who have died for the Empire a fine coloured print of her portrait with this autograph message:—"In sorrow and sympathy my thoughts fly across the seas to my sisters in India, that beautiful land which I have twice visited, and love so well. I send you this to do honour to a very brave soldier of the Empire who died for you and for us in the glorious fight for truth and freedom against tyranny and broken faith." The prints are reproduced from her Majesty's Coronation portrait, painted by Mr. William Llewellyn, A.R.A., which is now in Windsor Castle, and the reproduction has been executed by Messrs. J. Miles and Co., Ltd.

The well-known Criterion Restaurant and Theatre, Piccadilly, has been sold under the sanction of the High Court of Justice, Chancery, who invited tenders on behalf of the trustees of the debenture-holders of Messrs. Spiers and Pond, Ltd. Messrs. Yates and Yates, 12A, Hanover Square, W., were the agents connected with the sale, the purchasers being Messrs. Buzzards, of Oxford Street, W. There were two tenders before the Court, and Mr. R. M. Phillips, of 22, Conduit Street, acted in the negotiations for the Piccadilly Hotel, who only missed securing the property by a narrow margin. The restaurant and theatre were built for Messrs. Spiers and Pond in 1873, at a cost of about £80,000, and the Criterion Theatre was leased by them to Sir Charles Wyndham from May 3, 1903, for a term of forty-five years, the present rent for this portion being £3,050 a year.

The carved oak chair on which the chief bard of the Birkenhead National Eisteddfod will be enthroned is being made by a Belgian refugee, who has settled in the Cheshire borough. The design has been seen by competent judges, who all pronounce it to be one of the most perfect things of its kind they have ever seen, and the work of one who is evidently a master of his art. In an interview with the designer, Mons. Eugeen Vanfleteren, he stated that in pre-war times he carried on an extensive business at Malines, in which wood-carving was a special feature. Since his settlement in Birkenhead he has made Celtic art a particular study, and for the past year or two has had constant reference to works bearing upon the subject at the Liverpool libraries.

The annual general meeting of the Surveyors' Institution, to receive the report of the Council and the announcement of the result of the election of officers for the ensuing year, will be held in the lecture hall on Monday, June 4, 1917, at 6 o'clock. The prizes awarded to successful candidates in connection with the recent preliminary and professional examinations will be presented by the President at the annual general meeting. The following members have been appointed to act as scrutineers of the ballot for the forthcoming election of a Council for the ensuing year:—Messrs. J. H. Mellenfield, C. J. Lake, C. S. Burkett-Smith, R. B. Mann, and Geoffrey L. Vigers (Fellows), and H. S. Logsdon (Professional Associate).

Mr. Jesse Ainsworth Stott, of Stockport, Cheshire, a partner in Stott and Sons, Manchester, architects and engineers, has left £36,707.

We regret to announce that Mr. P. J. Brown, eldest son of the late Mr. John Brown, architect, Kilmorey Street, Newry, was killed in action on the 7th inst.

The exhibition, now in the North Court of the Victoria and Albert Museum, of works of art available for loan to country museums and schools of art, which it was proposed to close on May 5, will remain open for the present.

The Coventry Corporation are owners of a large housing estate at Stoke Heath, on the outskirts of the city, and owing to an unsuccessful agitation for a reduction in rents, the tenants on Saturday began a "no-rent" strike. In the windows of each of the 559 houses comprising the estate a card is being exhibited stating that a strike is in progress, and that "the collector need not call."

Captain Arthur Scott Buckton, R.G.A., who died on April 9 of wounds received the same day, aged twenty-eight, was the youngest son of Mr. and Mrs. Arthur Buckton, of Forest Gate, Essex. Educated at the East London College, he was a B.Sc. of London University, a Whitworth Exhibitioner, an Associate Member of the Institute of Civil Engineers, and an Associate Member of the Institute of Mechanical Engineers.

Mr. Robert Noble, R.S.A., died at East Linton, Haddingtonshire, last Saturday. Mr. Noble was born in Edinburgh in 1857. He exhibited his first picture at the Royal Scottish Academy when he was twenty, and later won the silver medal for landscape at the Edinburgh International Exhibition. He was the winner of the bronze medal at the Paris International Exhibition of 1900, and was the first chairman of the Society of Scottish Artists. He leaves a widow and two sons, both of whom are in the Army.

Captain Russell Alexander Colvin, Argyll and Sutherland Highlanders, who was killed on May 1, aged thirty-five years, was the second son of the late Russell Pakenham Colvin, B.C.S., and of the late Mrs. Colvin, of 24, Castletown Road, W. Kensington. An engineer by profession, he belonged to the London Scottish till he went to Egypt, where he spent some years on irrigation works, and later in survey work in the Sudan, where, alone with his retinue of natives, he penetrated country hitherto untrodden by the white man.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

***Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.

Telegrams: "Timeserver, Estrand, London."

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L.—Yes.

T. J. J.—Thanks. No.

NORBURY.—There is no "Complementary" Order of Architecture.

A small group of pictures, chiefly Italian and English, from Bridgewater House, will be on exhibition at the National Gallery on and after to-day.

Mr. William H. Wells, of Messrs. Chesterton and Sons, 116, Kensington High Street, London, W., was last Friday elected president of the Auctioneers' and Estate Agents' Institute of the United Kingdom for the ensuing year.

At Cape Town, on May 8, Lord Buxton, the Governor-General opened the Michaelis Gallery, presented to the public by Mr. Max Michaelis. Praising Mr. Michaelis's gift, his Excellency expressed the hope that a South African school of art might arise from it.

Mr. Edward Robert Robson, F.R.I.B.A., F.S.A., Fellow of the Surveyors' Institution, formerly of 2, The Paragon, Blackheath, architect to the London School Board, who died on January 19, aged eighty-one, left estate valued at £3,802 15s. 9d., with net personalty £3,633 4s.

Tenders are invited for executing improvements to St. Mary's Church, Glenfarne, for the Very Rev. P. Soden, P.P., V.G., in accordance with plans and specificationc prepared by Mr. J. J. McDonnell, J.P., architect, 27, Chichester Street, Belfast, to whom tenders are to be sent.

S. S. Platt, the borough surveyor of Rochdale, appealed last week for Samuel Smith (thirty-nine), married, a pavior (general service).—Mr. Platt said they had only three paviors and a boy for the whole of the borough. They had also to look after the repair of the tramway track. Five had joined the Army, and one had gone on munitions work.—Put back till July 7.

The students of the Belfast Municipal Technical Institute Art School have been invited to submit designs for a bronze memorial tablet in memory of the late Mr. McFadzean, a former student of the Institute, who won the V.C. for gallantry at the cost of his life. The memorial will also contain the names of pupils of the school who have been killed in the war. Drawings have to be deposited not later than June 29, 1917, with the headmaster of the School of Art, Belfast.

Mr. Herbert William M. Willett, of 3, Brasenose House, Kensington Court, head of the firm of contractors, auctioneers and estate agents, of Sloane Square, Kensington, Hampstead, Chislehurst, and Hove, died on the 9th inst. at the age of thirty-two years. He was the eldest son of the late Mr. William Willett, of the "daylight saving" scheme. Mr. A. G. Minter, who has conducted the auctioneering and estate agency of the firm for many years, will continue the management of that department.

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THE BUILDING NEWS

AND ENGINEERING JOURNAL.

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Garden House at end of Terrace, "Foxbury," Chislehurst, Kent. Capt. Maurice E. Webb, M.A., R.E., Architect.

"Redcote," Haslemere, Surrey. Garden Front. Messrs. Alfred H. Hart and P. Leslie Waterhouse, FF.R.I.B.A., Architects.

Boys' Garden City, Woodford, Essex. Types of Houses. Plans and Elevations. Mr. William H. Pite, F.R.I.B.A., Architect.

The Problem of the Small Dwelling and its Solution. Typical examples of one-story cottages by Mr. Robert Thomson, Architect.

Currente Calamo.

Lord Rhondda, President of the Local Government Board, received a deputation last Thursday from the Welsh Housing and Development Association and the South Wales and Monmouthshire Labour Housing Conference, recently held at Cardiff, on the subject of housing in South Wales after the war. The deputation, introduced by Mr. David Davies, M.P., proposed that the Government should allocate not less than £5,000,000, to be advanced immediately after the war, on reasonable terms, to local authorities in Wales and Monmouthshire for the erection of working-class dwellings. Lord Rhondda said very little could be done in building before the war was over, owing to finance and the scarcity of labour; but after that there was no question in his mind as to the need of substantial help being given by the Government in the matter of housing for the working classes. We hope the help will be given in the right way. Much of the money will be wasted if the spending of it is entrusted to amateur planners and associations. Let Lord Rhondda finance the regular builder and see that he gets good sites on reasonable terms, and he will soon render the present house-famine a bitter but wholesome memory of the mischief wrought by bad State finance and other needless hindrances

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Yesterday an important and representative deputation of national organisations connected with housing by private enterprise was received by Lord Rhondda at the Local Government Board Offices. Sir John Rolleston, a past president of the Surveyors' Institution; Mr. Edwin Evans, president of the London Property Owners' Association, Ltd., and Mr. A. W. Shelton, president of the Nottingham Property Owners' Association (the largest in the country), attended as conveners of the November conference and organisers of the deputation. The officially appointed delegates included Mr. W. H. Wells and Mr. J. Geo. Head, president and vice-president respectively of the Auctioneers' and Estate Agents' Institute; Mr. E. J. Sadgrove, president of the Society of Architects; Mr. G. Lipscomb, president of the Land Agents' Society; and Mr. M. Cheverton Brown and Mr. E. Russell Taylor, president and vice-president respectively of the National Federation of Building Trade Employers. The result of the interview, of course, did not reach us yesterday in time to report or comment on it. It is probable Lord Rhondda heard more common-sense talk than he has listened to lately from some of the fad-mongers.

The defects in hitherto erected dwellings for the people are familiar to most of us. They are to be found in the great majority of those built in the past; and, certainly, more frequently in those erected by municipal bodies, philanthropic combinations, and charitable agencies than in those for which the not seldom decried private builder has been responsible. For the failures of the past excuses may have been more or less reasonable, such as want of adequate means, and confinement to unsuitable sites—sometimes insanitary, and at others too limited. For those of the present, as at Well Hall and Rosyth, one can hardly accept such pleas. In each case cost has not been stinted, and the Government has the power—and, at present, the will—to spend and take what it likes. But the greatest discouragement to practical workers is to be found in the authoritative examples set forth in the two collections of cottage designs endorsed by the Departmental and Advisory Committees appointed by Mr. Runciman when President of the Board of Agriculture, which have been issued as models for the guidance of local authorities and others. There is no need to recapitulate our past criticisms. As regards the main points, they are admitted by the committees themselves in regard to shortage of space, bad ventilation, and the use of the scullery as a wash-house. They are again pointed out at length in a series of articles we commence this week by Mr. Robert Thomson, an architect who has devoted much time and attention to the matter, and, we think, with good results. He has certainly succeeded in giving more accommodation, at a less cost and of a healthier character, than the model plans of the Departmental Committees. His plan is novel and ingenious, and his adaptation of modern methods of construction secures economy without the sacrifice of space or stability. We think our illustrations and descriptions of Mr. Robert Thomson's plans, patented by himself, will commend themselves to architects and builders who have really studied this branch of building, to local authorities concerned, and to all who are waging the battle against the disease and discomfort intensified by the present house-famine.

The whole building world has been hard hit by the war. Builders and contractors who had entered into agreements as to future work during the time of profound peace which reigned down to its beginning would have been wiped out altogether had not the Courts stepped in to their aid. The latest case of "Innholders' Company *v.* Wainwright" shows this, and will be a guide in many other similar disputes. In February, 1914, when there was no thought of war, the defendant made an agreement to take certain land from the plaintiffs on a building lease. At that time there were some houses on the site, and the terms were that, as the existing tenancies ran out, the defendant should pull down the old buildings and put up new ones. This came to pass in June, 1916, when defendant took possession of the land, and began pulling down the old buildings; but before he could begin any new work the Ministry of Munitions, on July 14, 1916, issued an order stopping all building without a licence, which they refused to give him. So the land was idle and earning nothing. Now the plaintiffs sued for £550 as two quarters' rent under the agreement due in June and December, 1916. The plaintiffs' case was based on their purely legal rights under this agreement for a building lease, and there were some pretty technical points taken upon the clauses in the contract. But the dead fact was that the prohibition to build made the land useless for the time. How then could the defendant be made to pay rent as upon a lease that could not be granted? Mr. Justice Ridley said that he might hold the contract impossible and so dissolved, as was done lately in "Metropolitan Water Board *v.* Dick, Kerr and Co."; but he thought it would be fairer to hold that it was suspended while the prohibition of building was in force. There-

fore judgment was given for the defendant, with costs; and after the war this contract can be taken up and completed. Any other legal decision would have been contrary to every rule of justice.

Ingenious American contractors who have found the motor truck a great value in economical transportation of building materials have learned that its usefulness is not limited to work on the street level. In building factory structures of the latest reinforced concrete type it is desirable to move materials to the upper floors of the building as the work progresses. It is possible, where space is available, to build inclines or ramps, by which the heavy motor truck can take its load up to an upper story as well as to the ground level. This makes it possible for the contractor to deliver the materials of construction right where they are needed. This arrangement is susceptible to many variations, and can be used just as well in wrecking structures as in building them. It is stated that the cost of building a ramp is more than compensated for by the saving made possible in transportation. Without an incline of this kind all loads must be delivered at the ground level, and materials to be used on the upper floors must be hoisted by the temporary and small capacity contractor's elevator. In this country the motor has as yet been little used by builders, possibly because motor-makers are too busy otherwise, or not wide-awake enough to devise and make known to builders suitable motor appliances.

The Province of Quebec Association of Architects have written to the Montreal Board of Control asking the latter to receive a joint deputation of the society, Builders' Exchange, and Canadian Society of Civil Engineers on the subject of the building by-laws. This is a very old question; it has been discussed for years, and, as a result of much work, a new code was drawn up by a committee representing the interests affected. This code has been amended and has been passed on by the city's legal department. There the matter rests; and, in consequence of the long delay, the deputation will ask that the code should become operative at the earliest moment. The city is now under a set of by-laws framed many years ago, which, it is contended, are not suitable for present-day conditions. It is nearly time similar action was taken by kindred interests this side. It is increasingly obvious that English building by-laws need considerable revision in view of changed conditions, and especially of the huge leeway that must shortly be made up in house building, which is certain to be hindered if present restrictions are not modified.

We have learned something about kitchen planning this week from an article in the *American Architect* by Mr. Herbert Wheaton Congdon, A.I.A. He says:—"The relationship of the kitchen to the rest of the plan varies according to the problem. In a very large house it should be in a service wing, and connected to its own suite of dining and sitting rooms: a house within a house. In a very small house it will be within the rectangle of the main plan, related very closely to the dining-room. Where this is necessary comfort suggests that the room over it be an important bedroom. A sarcastic client once directed that the guest-room should be placed directly above the kitchen. When his architect called his attention to the disturbances of those precious hours of morning slumber that were sure to ensue, he replied in the terse words of Poor Richard: 'After three days, fish and visitors *stink*.' Efficient planning!"

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION.

By ROBERT THOMSON.

[With Illustrations.]

The efficient planning of small dwellings, in which the greatest possible economy is essential, is a science the elementary principles of which are not yet understood by those who at present either pass or pose as experts in the designing or in advising as to the planning of such cottages. Every cottage plan I have seen yet published as a solution of the housing problem provides eloquent testimony in support of this statement.

The most authoritative examples available for submission in this connection are to be found in the two extensive collections of cottage designs put forward by the Departmental and Advisory Committees appointed by Mr. Runciman when President of the Board of Agriculture. These designs, which by instructions of the Government are at present being sold as models for the guidance of local authorities and others, are so deficient in good planning as to be an insult to the intelligence of those for whom they have been issued. Even the model design No. 8, the plan of which the Advisory Committee states "provides one of the most convenient and economical of cottages," does not permit of one-half the possibilities of the materials employed in its construction being utilised in the provision of habitable houseroom. That this statement is not unfounded is conclusively proved by plans which will appear in subsequent issues of this journal.

Before entering upon the main series of examples in which this highly commended official model occurs, it will be well to clear the way by an investigation of the possibilities and limitations of the committee's model one-story cottages, and while doing so to show what *is* and what *is not* planning.

The official collections of designs contain three examples of the single-story type of cottage, and the plans of all three, which are reproduced in Figs. 1, 6, and 7 on the sheet given on another page, will be dealt with in the present chapter, No. 2 of the Advisory Committee's report being taken first. Since the committee claims that "This design is made to provide in the smallest plain rectangular building the minimum accommodation which should be provided for a labourer's cottage," it may be taken for granted that its plan shows the utmost in the way of houseroom, comfort, convenience, and economy which its authors believed it was possible to give with the materials employed.

Being only one-story high, it presents the planning problem in its simplest possible form, and ought therefore to be free from any drawback capable of being adversely criticised. This, however, is not the case, for when cursorily examined with the seeing eye its plan is found to be fairly bristling with glaring defects of the most elementary character. The most easily recognisable of these defects are seen in the distortion and mutilation of the apartments, a type of planning which is greatly favoured, if not actually originated, by the Garden City experts. Two examples of mutilation are seen in Fig. 1—one marked A, where the lobby is cut out of the kitchen, the other at B, where the larder is cut out of the scullery. Two examples of distortion are also seen—that at C, in which the wasted floor space is tacked on to the bedroom, forming a disfiguring recess to this apartment; the other at D, where the floor area so marked is obviously merely passage-way, which would probably not have been added to the floor area of the living-room if it had not been to bring up the air space to meet the committee's meagre requirements. Air space does not, however, meet the need for floor space, and the area of this apartment would be correctly stated at 154 instead of at 177 square feet.

The disposition of the fireplaces affords further evidence of inefficiency on the part of the man at the end of the pencil with which this plan was drawn. The use of the word planning in this connection would be out of place. Arranging fireplaces against an outer wall is a sure means of causing trouble, and the failure to provide a suitable exhaust flue from a bedroom is evidence of inefficiency on the part of an expert which, since it adversely affects the health of the occupants of such apartments, should be treated as a crime. The omission of a fireplace from the scullery is another defect which ought not and need not be.

There is not even a proper place in the scullery in which to put a bath, although the committee state that if there is one it *must* be placed there.

This design by itself alone would justify the statement that there are those thoughtlessly undertaking responsible advisory work who do not know sufficient of the subject they profess to even recognise the most glaring defects in their own work. If this plan has been issued as a model with a knowledge of its defects, then its authors, having this knowledge, are doubly responsible, but this design does not stand alone; there are many like it. To issue or permit the issue of such plans is to tamper with the health of the occupants of the dwellings built to them. The very existence of these defects affords the clearest possible evidence that could be adduced of the lack of planning in this model design. The object and purpose of planning is to get rid of defects, and for every defect eliminated a corresponding advantage is obtained.

The relative arrangement of bed and fireplace in the parents' bedroom is surely not the result of planning, since the bed would require to be moved before a fire could with safety be kindled in the fire-grate. The relative arrangement of bed, door and window in each of the two smaller bedrooms is also defective.

The result of employing a little "common sense" in regard to the planning of this official design is seen in Fig. 2, in which every one of the defects just mentioned has been eliminated. A glance will show that every one of the five apartments benefits. For example, space for a bath is provided in the scullery, and as this apartment is equipped with a fireplace, it can thus be used as a kitchen, thereby enabling the occupants of the living room to free themselves from the

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unpleasant odours of cooking if they so desire.

Although plan Fig. 2 is undoubtedly a great improvement on the official plan, it has still many defects, but these, simply by employing a little more elementary planning, can easily be got rid of, with material advantage to the occupants. The principal bedroom, for instance, opens out of the kitchen, instead of from the entrance lobby, and its fireplace is flanked by the doorway; the scullery is small, the larder faulty, and there is great waste of material in having an outbuilding. When economy is so essential that the committee found themselves forced to jeopardise the health of the occupants by sacrificing space in a futile attempt to secure it, surely outbuildings were inadmissible. In transcribing the areas from my sketch book to the finished plans three mistakes have been made. In Fig. 1, instead of 65.5 in the smallest bedroom read 67.5, and in Fig. 2 instead of 92.75 in the parents' bedroom read 160, and instead of 180 in the living-room read 185.6.

The result of arranging all the accommodation under one roof is partly shown in plan Fig. 3. It consists in the larger kitchen, the better larder, the direct access from the entrance lobby to the parents' bedroom, and in the improvement in the living-room which this effects. These are, however, only a small part of the advantages. The outstanding gain cannot be shown on the plan. This consists in an increase of the ceiling height of the walling materials of the official plan to 9 ft. 8 in. instead of 8 ft., which is the officially standardised height on which the present comparisons are based. The effect of this is to raise the air space in the five apartments from 4,404 cubic ft., as in plan Fig. 1, to 5,720 cubic ft. in plan Fig. 3, thus showing an increase which, when priced at the pre-war rate of 15d. per cubic ft., shows a gain of £82 5s. in favour of plan, Fig. 3.

Reviewing these three plans, they serve to illustrate three degrees of comparison, Fig. 3 being bad, Fig. 2 worse, and Fig. 1 deplorable.

Although this plan would provide a house having many advantages over one built to plan Fig. 2, and still more over one built to the official model, it would itself give a very incomplete dwelling. Some among its many drawbacks would be (1) the absence of a bathroom, (2) the want of a pantry, (3) the need for cupboards opening off the living-room, (4) the larder opening out of the kitchen-scullery, (5) the lack of an entrance porch, (6) the small size of the living-room, and (7) the absence of a porch which, when of sufficient size to accommodate the family, is always a much prized adjunct to any dwelling, whether large or small.

Plan Fig. 4 shows how, by the addition of a wing, measuring over the walls only 90 square feet, these drawbacks not only disappear, but a substantial gain in the area of the parents' bedroom results, and Fig. 4a shows how a large cupboard might be provided for this bedroom. By adding this wing, the roofed area of plan Fig. 4, when measured over the walls, becomes exactly equal to that of the official plan shown in Fig. 6, and is only four square feet less in area than the third official plan shown in Fig. 7, when the roofing of its covered yard is omitted.

It should be specially noted that the entrance to this dwelling, instead of being towards the street, as in the three preceding plans, opens towards the garden. This arrangement has many advantages. To begin with, it offers much greater privacy, and young children can be kept out of doors under the direct control of their mother, who might not care to appear at the front in her working garb. It would also allow of the large semi-enclosed entrance porch being used for sleeping purposes, if required, for the outdoor treatment of consumptives.

There is, however, this very important difference between Figs. 4 and 6—the official plan with a ceiling of only 8 ft. employs more brickwork than is required to give plan Fig. 4 a ceiling 10 ft. 3 in. high. The result of this is that while the model plan with an 8-ft. ceiling gives 4,664 cubic feet of air space in its five apartments, the air space in the corresponding apartments in plan Fig. 4 amounts to 6,321 cubic feet. The difference when priced at 15d. per cubic foot shows a gain in space to the value of £103 11s. in favour of the newer plan, and it has its many other advantages besides to its credit. It may be helpful to a clearer understanding of what this gain in space means when it is known that the corresponding figure of cost in the case of the Government's Well Hall housing scheme the rate works out at much nearer half-a-crown than fifteen pence per cubic foot. Are the Government perpetrating these inexcusable extravagances in their Rosyth housing scheme now in progress? I am told that they are.

Fig. 7 shows the Departmental Committee's model plan XXVIII. Excluding the covered yard, the roofed area of this plan works out at 884 square feet, while that of the plans Figs. 4, 5 and 6 are each 880 square feet. It is the only example of concrete construction given in the official collection. The committee state that "The design being square in plan, has the minimum length of outside wall for the inside area." They appear to think that because they have adopted the simple and theoretically perfect figure of the square as the basis of their plan, they must necessarily have secured perfect results. That this naïve assumption is quite unwarranted is proved by reference to plan Fig. 5, which is also suited for concrete construction.

Since the scullery in plan Fig. 7 is not separated from the living-room by a lobby, its air contents are not included in the house room.

In this plan money is squandered on three chimney heads where two would be more satisfactory. The lobby, although only 3 ft. 4 in. wide in the rough, wastes space. A comparison of the section of this plan, Fig. 9, with that of plan Fig. 5 or Fig. 10 shows a difference in the arrangement of foundations by which substantial economies and other advantages are secured, which will be dealt with in a later chapter.

It should be noted that the walling of the plans shown in Figs. 1, 2, 3, 4, and 6 is similar to that employed in the lower story of two flatted cottages. There is obviously something wrong in this. Either the walls of the single-story cottage are unnecessarily strong, or those of the two-story type are insufficiently so. Both cannot be right. In the true bungalow the thickness of the walling is arranged in accordance with the requirements of a one-story building. In official practice, however, instead of securing the economy which this offers, money is wasted in making them sufficiently thick and strong to carry another dwelling in an upper story.

Plan Fig. 5 shows the result of giving effect to this method of securing economy. Its air space, exclusive of the pantry and cupboards opening out of the living-room, is 6,582 cubic ft., whereas that of plan Fig. 6, which has no conveniences, is only 4,664 cubic ft., the difference when priced at 15d., as before, showing a gain in space worth £119 17s. in favour of plan Fig. 5.

There is at present much talk of concrete construction and the economies it can effect. It should, therefore, be interesting to compare the difference between plans Figs. 4 and 5. The air space of the former is 6,321 cubic ft., while that of the latter is 6,852 cubic ft., the difference between the two being 531 cubic ft., which at 15d. is worth £33 3s.

Besides the increase of space, plan Fig. 5 has other very important advantages over plan Fig. 4. Its living-room, for example, is a through room, with windows on two fronts. Its floor area is much greater than the official "desirable" standard, and the volume of its air contents about twice as great as that officially required in a labourer's dwelling. Its parents' bedroom, although only 2½ square ft. greater in floor area than that in plan Fig. 6, gives a very superior arrangement of apartment.

The direct comparison lies between plans Figs. 5 and 7, and the reader will benefit more if he figures out for himself the advantages of the one plan over the other. Had the committee's work been efficient and the sizes of apartments which they put forward sufficient, they ought to have given the comforts and conveniences seen in the wing of plan Fig. 5 in a dwelling having a roofed area of only 650 square ft., as shown in plan Fig. 8, instead of their concrete box shown in Fig. 7.

The cryptic-looking arrangement shown in Fig. 11 is merely the distorted and mutilated apartments of the official plan, Fig. 1, disposed within a rectangle, such as the shape of every apartment in a small dwelling ought to be.

Notwithstanding the many advantages over the official type of dwelling which are offered by plans Figs. 4 and 5, these go only about half-way on the economical path by which the perfect dwelling is at last reached.

The villa and suburban planning and other similar associations will require to do a very great deal of furious thinking before they will be in a position to competently advise Lord Rhondda on his housing policy.

By the time the members of these associations have completed their thinking, Lord Rhondda, if he carefully follows this and the succeeding series of plans which will appear in the pages of THE BUILDING NEWS, will himself know a very great deal more than his advisers could at present tell him. Some illustrations of the plans of the Government's Well Hall Housing Scheme, if accompanied by an honest criticism, will give private builders and others an insight into some of the drawbacks of State conducted enterprises in the house-building line.

(To be continued.)

It has been agreed to carry out repairs and other works at the Hill End Asylum, Herts, at an estimated cost of £1,500.

The Freemasons of South Shields have presented to the municipality a bronze statuette in memory of John Kilpatrick, the Australian Field Ambulance man who was frequently mentioned in the reports of the operations in Gallipoli as "the man with a donkey," and was at last shot through the heart. The statuette was exhibited at the Royal Academy last year.

The death is announced, at North Berwick, of Mr. Benjamin Hall Blyth, a well-known Scottish civil engineer. Mr. Blyth, who was born in Edinburgh in 1849, was associated with many of the most important engineering works carried out in Scotland during the last half-century, including in particular the reconstruction of the Waverley Station and the rebuilding of the North Bridge in Edinburgh.

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EXCESS OF WATER INJURIOUS TO CONCRETE.

Excess of water has a very injurious effect in the manufacture of concrete, and the greatest improvement that can be made in present methods will come from a better appreciation of the dangers resulting from a too wet mix. In the "Concrete Highway Magazine," published by the Portland Cement Association, Prof. Duff A. Abrams outlines the evils of excess water, and suggests the remedy. His article follows :—

Experience has indicated about what proportion of cement and aggregate must be used to give concrete of the necessary resistance for a given purpose, but little attention has been given to the inter-relation of the effects of varying quantities of water on the resistance of the concrete.

A thorough investigation of this subject is in progress at the Structural Materials Research Laboratory, Lewis Institute, Chicago. These tests have shown the following relations to obtain :—

1. With a certain aggregate of the same grading and sufficient water to produce a concrete of a given plasticity, the strength of the concrete, within the usual range of mixes, is proportional to the quantity of cement in a unit volume of concrete.

2. With a given aggregate and the same quantity of cement, the strength of the concrete is a maximum with the smallest quantity of water which can be used to produce a plastic mix; any increase in the quantity of water is accompanied by a very rapid falling off in the strength of the concrete.

3. With a given aggregate mixture, the same quantity of cement, and sufficient water to produce a concrete of definite plasticity, (a) the strength of the concrete increases with the "coarseness" of the aggregate up to a certain limit; (b) this limit of "coarseness" is higher for a larger quantity of cement and lower for a smaller quantity of cement; (c) the limit of "coarseness" of the aggregate which it is feasible to use varies slightly with the character of the material, being somewhat lower for a mixture of sand and crushed stone than for sand and well-rounded pebbles, and lower still for mixtures in which crushed stone or similar material is used as fine aggregate.

4. For given proportions of cement and aggregate the quantity of water required for a definite plasticity depends largely on the grading of the aggregate and to only a minor degree on the character of the material, shape of particles, etc.

5. For a given aggregate, the quantity of water required to give concrete of the same relative plasticity is directly proportional to the quantity of cement.

TOO MUCH WATER USED.

If we assume that concrete materials of suitable character are at hand, and that mixing and other details are properly cared for, the engineer generally has the following alternatives for improving the quality of the concrete :—

(a) More cement.

(b) Coarser aggregate (within certain limits).

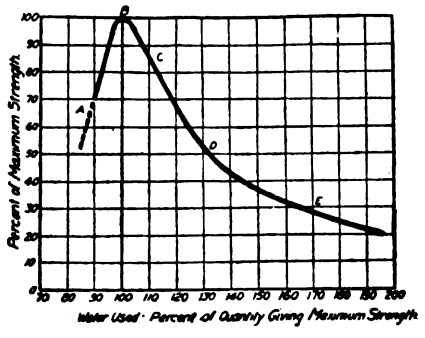
(c) Less water (limited by the necessity of producing a plastic mix).

Economy dictates the use of the smallest quantity of cement which will produce concrete of the desired resistance. The tendency has been during recent years to use entirely too much water; in many instances the water used is 50 to 100 per cent. in excess of the quantity which gives the highest strength, resulting in concrete of not more than 25 to 50 per cent. the strength that should have been obtained with the same cement and aggregate and a proper quantity of water. While some sacrifice in strength is generally necessary in order to secure concrete which may be handled and placed at low cost, it is absurd to sacrifice 50 to 75 per cent. of the strength which is practically available in this way. While the injurious effect of excess water in concrete has been given little attention, a great deal of emphasis has been placed on the benefits to be derived from the use of coarse, well-graded aggregate.

The experimental work referred to above has already thrown much new light on the subject. We are forced to the conclusion that the chief advantages of well-graded and coarse aggregate as compared with poorly-graded aggregate comes from the fact that the concrete can be mixed to a workable plasticity with less water, and not to any inherent differences in the behaviour of aggregate of different sizes. In other words, while coarse, well-graded aggregate is highly desirable, little or nothing is gained by using aggregates of the highest grade unless we take advantage of the fact that it can be mixed with correspondingly less water. This makes it apparent that many of the shortcomings of concrete made of fine or poorly-graded aggregate should be charged to the additional water required to mix the concrete.

LIMIT TO QUANTITY OF WATER.

It is as important that an upper limit be placed on the quantity of water as it is that a lower limit be placed on the quantity of cement in the batch. It would be just as consistent to specify the quantity of aggregate and water and leave the proportioning of the cement to the judgment of the mixer foreman as to specify the quantity of cement and aggregate and leave the proportioning of the water to the mixer gang. Exactly the same effect is produced by the use of an excess of water as by a deficiency in cement; and it is more important now that special attention be given to the water in concrete, since the present methods give reasonable assurance that the proper quantity of concrete is used.



Strength is affected by amount of water.

All the benefits which may arise from using good cement, coarse, well-graded aggregates, thoroughly mixing the concrete, etc., are completely nullified if an excess of water is used in the mix.

The diagram summarises the results of compression tests on 6 x 12-in. concrete cylinders made in mixes ranging from one part cement and nine parts aggregate to one part cement and two parts aggregate by volume. These mixes represent concretes of all qualities from the leanest to the richest which are generally used for any purpose. The aggregate consisted of a mixture of sand and pebbles graded in size from the finest particles up to 1½ in.; exactly the same grading was used in all cases.

These tests show that the effect of proportional changes in the mixing water is approximately the same for all mixes of concrete; consequently a composite curve has been drawn to show the average effect. The vertical distances represent the relative strength of concrete, expressed as a per cent. of the maximum which can be secured from a given amount of cement and the same aggregates. The horizontal distances indicate the relative quantity of water used in the mix, considering the amount which gives the maximum strength as 100 per cent.

The amount of water which gives the maximum strength in concrete produces a mix which is too stiff for most purposes. In plants where such products as building units, drain tile, sewer pipe, etc., are manufactured it is desirable to use a mix even drier than that which gives the maximum strength. The moulds can thus be removed within a short time; this would be impossible if a wetter and more plastic mix were used.

It will be noted that the concrete strength increases rapidly with the quantity of water over the range indicated by A-B on the diagram. With any further increase in the amount of water there is a rapid falling off in strength, as indicated by the curve BCDEF. With an amount of water about double that required for highest strength, the concrete has only about 20 per cent. of the maximum strength.

The exact amount of water corresponding to the maximum strength of concrete will vary with the method of handling and placing the concrete. Any method which involves puddling, tamping, rolling, or vibration, or the exertion of pressure in any manner, will have a tendency to increase the strength of the concrete, regardless of the amount of water used. However, it is probable that the effect produced by these methods will be more pronounced in the consistencies in the vicinity of the maximum strength.

"In mixing concrete use the least quantity of water that will produce a workable mix, then give the concrete as much water as possible after it has begun to harden," is the only safe rule to follow. The amount of water which should be used with given materials cannot always be determined in advance; it will also vary with the nature and size of the work. However, every effort should be made to keep the water content of the concrete at a minimum. It is not feasible to use the quantity of water corresponding to the highest possible strength of concrete (a similar statement may be made with reference to the "coarseness" of the aggregate), yet this difference should be reduced to a minimum by using the smallest practicable amount of water.

The abuse of the water element in concrete has come about solely from the fact that it is cheap, and frequently facilitates handling and placing. Much of the concrete which is being made at the present time could be greatly improved, at no additional cost, if the owner were compelled to pay, say, ½ to 1 per cent. per gallon for all water going into the mixer. In many respects it is unfortunate that water is not an essential element in the cost of concrete.

Probably the greatest improvement which can be made in our present methods of manufacturing concrete will come from a better understanding of the very injurious effect of excess water and a saner practice in proportioning this important element of the mix.

THE SURVEYORS' INSTITUTION.

PROFESSIONAL EXAMINATIONS, 1917.

The following students have been successful in passing the Intermediate Examination :—Cecil Burkitt, Nicholas Henry Nelson Darby, George Frank Edwards, Alan Charles Golding,[1] Arthur Harold Halls,[2] Hugh Herington Ingleby, Cecil Kennard, Victor Russell Westrope.

The following non-students have been successful in passing the Intermediate Examination :—Charles Anthony Ash, William George Austin Clark, Henry Colbeck, A.R.I.B.A.,[3] Charles Harold Read Davis, Simon Evans, William Henry Forder,[4] Richard Jackson, John Lowe, Robert Gerald Hustler Newbigging, John Owen Parry,[5] Benjamin Grant Robinson, Henry Cecil Rudkin, Alfred Ernest Shaw, Leonard Joe Taylor, Thomas Percival Tinsley, Norman Wailes, Donald Warder.

Irish candidate :—Robert Alexander Mitchell.

The following candidates have been successful in passing the Final Examination :—George Henry Allison,[6] William Wellington Berry,[7] George Godfrey Bourne, Ellis Samuel Driver, Richard Edwards, Charles Glossop Else, Thomas Phillip Francis, Daniel Griffiths, William Keay, Ernest Stephen Purry, Ernest John Rees, John Seymour Rutherford, Second Lieutenant Denis Charles William Sanders, R.F.A., Charles Hedley Wastell, John Caffin Wheeler,[8] Frederick Willey, Gwilym Williams, John Henry Wilson.[9]

Scottish Candidates :—Thomas Adam, Joseph William Geddes.

The following candidates have been successful in passing the Direct Fellowship Examination :—Frederick Percy Dolamore, Francis Tippett Howes, Noel Dennis Sheffield, Arthur Lloyd Thomas, David John Williams.

[1] Special Prize, [2] Institution Prize, [3] Building Prize, [4] Beadel Prize, [5] Penfold Silver Medal and Driver Prize, [6] Quantities Prize, [7] Galsworthy Prize and Mellersh Prize, [8] Penfold Gold Medal, [9] Crawter Prize.

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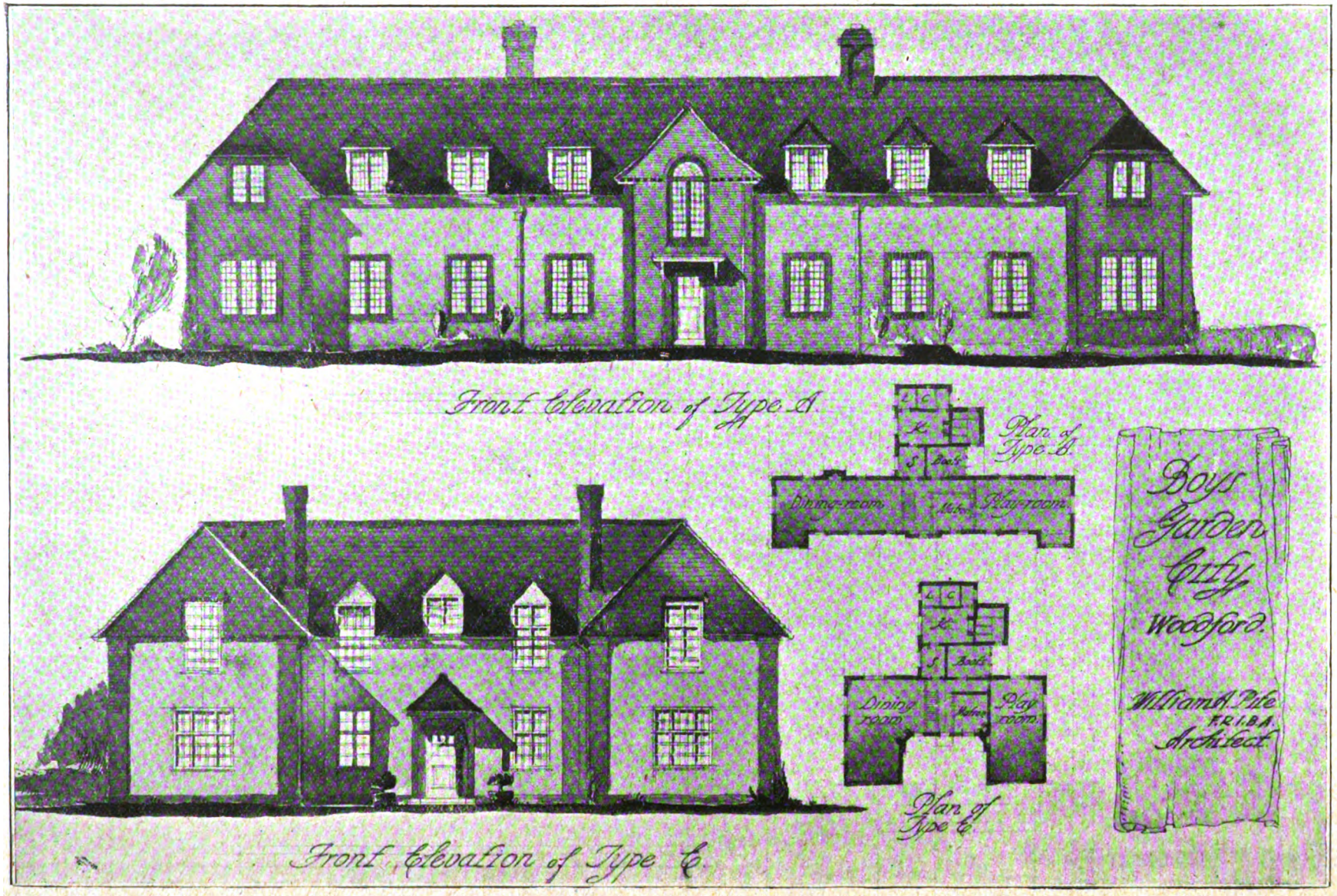

BOYS' GARDEN CITY, WOODFORD, ESSEX: TYPES OF HOUSES.—WILLIAM H. PITE, F.R.I.B.A., Architect.

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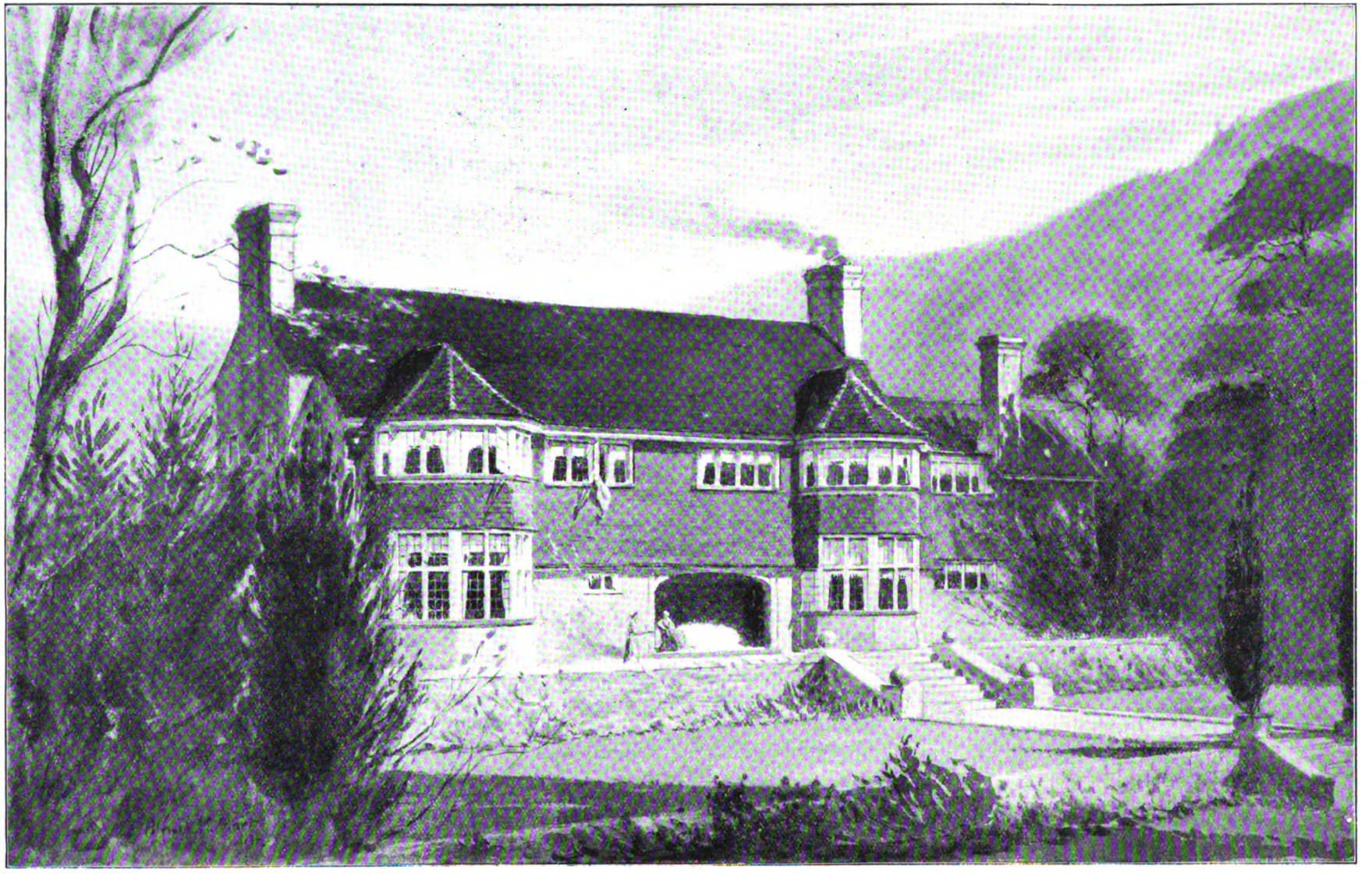

"REDCOTE," HASLEMERE, SURREY: GARDEN FRONT.
Messrs. ALFRED H. HART and P. LESLIE WATERHOUSE, FF.R.I.B.A., Architects.

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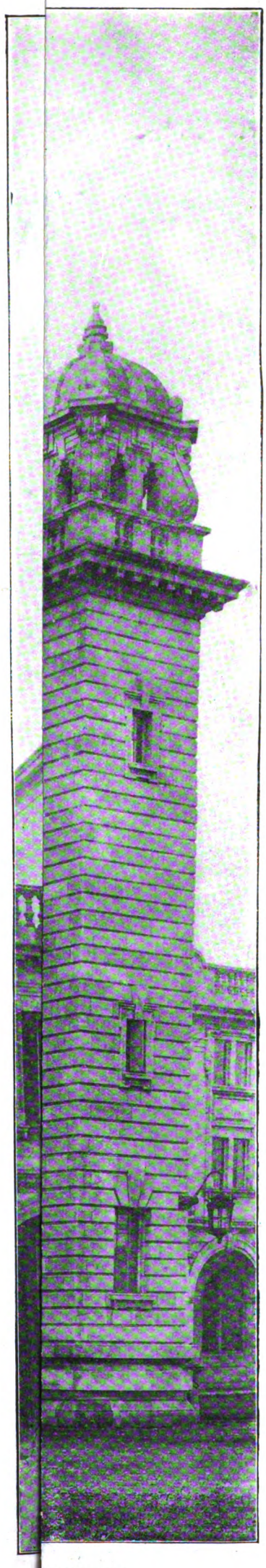

FACADE.

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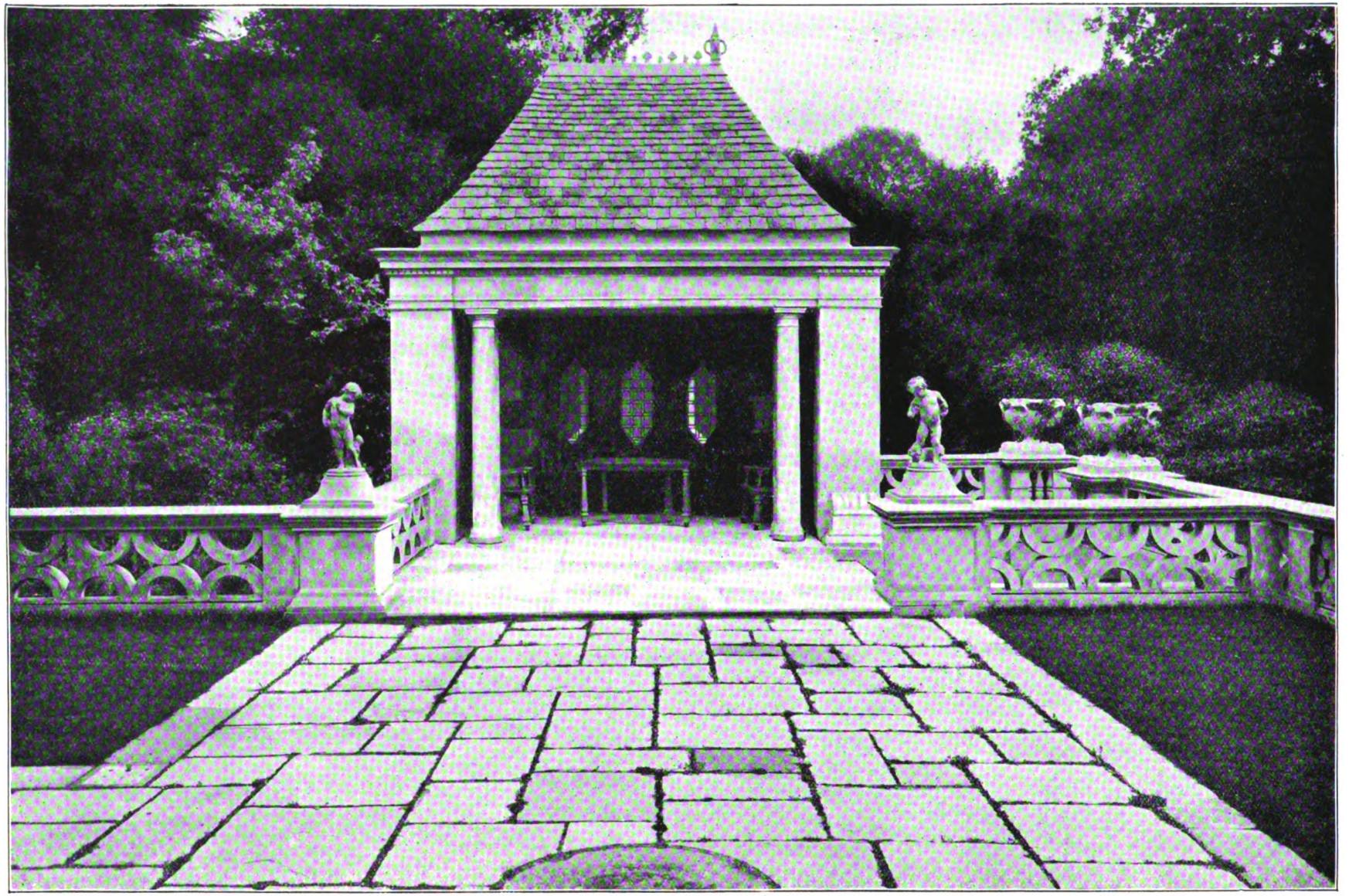

GARDEN HOUSE AT END OF TERRACE, "FOXBURY," CHISLEHURST, KENT.
Captain MAURICE E. WEBB, R.E., M.A., Architect.

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FIG. 1

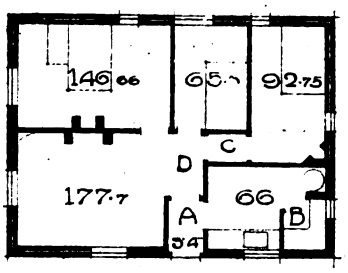
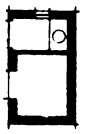


FIG. 1a



4404
790 5·563

FIG. 2

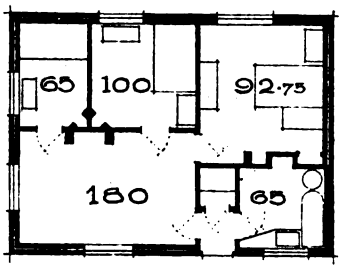
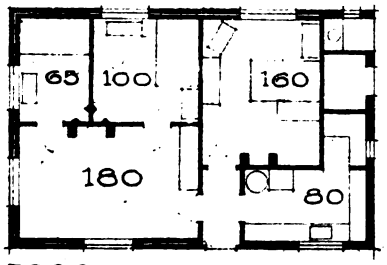


FIG. 2a

4604
790 5·828

FIG. 3



5720
790 7·240

FIG. 4

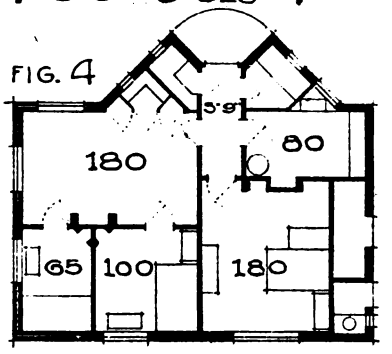
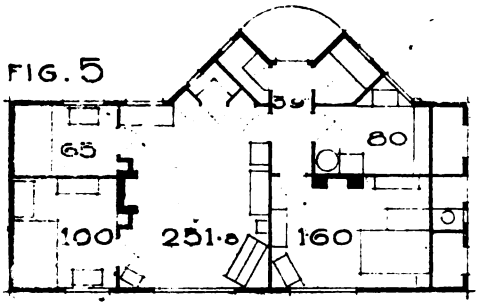


FIG. 4a

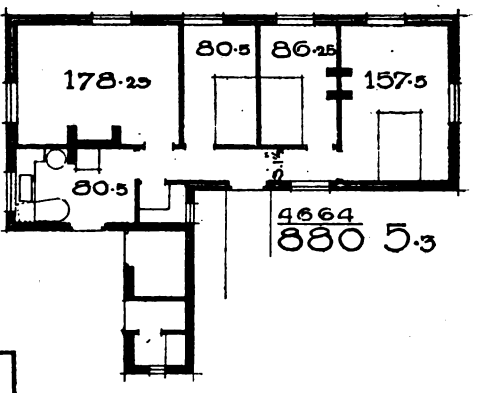
6321
880 7·182

FIG. 5



6852
880 7·786

FIG. 6



4664
880 5·3

FIG. 11.

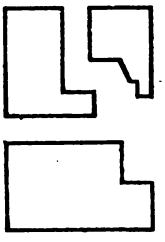
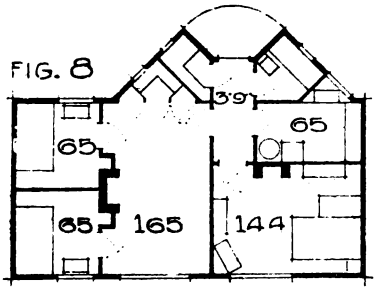


FIG. 8



5286
650 8·152

4492
884 5·081

FIG. 7

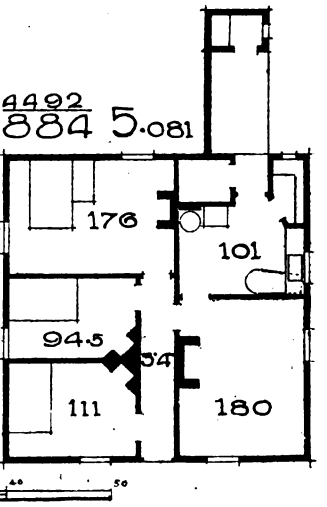


FIG. 9

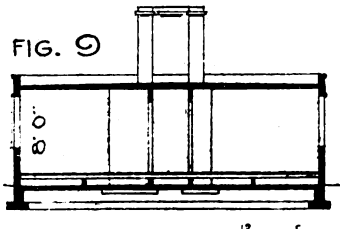
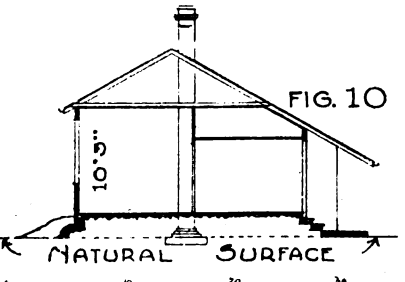
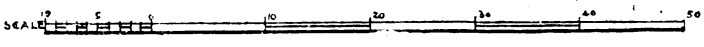


FIG. 10





THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION

By Robert Thomson, Architect.

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Our Illustrations.

CARDIFF UNIVERSITY COLLEGE OF SOUTH WALES AND MONMOUTHSHIRE. THE LIBRARY FACADE.

This photograph, now at the Royal Academy Exhibition, represents the library gable recently completed in connection with the first portion of the buildings of the University College of South Wales and Monmouthshire. The work is executed in Portland stone. The figure of St. David occupies the niche in the upper part of the gable. Mr. W. D. Caröe, M.A. (Cantab), F.S.A., F.R.I.B.A., is the architect. On January 31 last we published a view from the Royal Academy of last year, showing the range of buildings still to be built in completing this University for Wales at Cardiff.

GARDEN HOUSE AT END OF TERRACE, "FOXBURY," CHISLEHURST, KENT.

This photograph is now shown at the Royal Academy Exhibition. The subject is self-explanatory. The sculpture was done by Mr. P. R. Montford, and the contractors were Messrs. Higgs and Hill. The architect is Capt. Maurice E. Webb, R.E., M.A., of Queen Anne's Gate, Westminster, who is now in Salonika with the British Forces.

REDCOTE, HASLEMERE, SURREY.

This house occupies a site cut out of the side of a hill, with a south-east aspect, commanding unusually extensive views over the Haslemere and Hindhead country. In the design full advantage has been taken of this, and an open-air living-room or loggia on the garden front, shown in our view, forms a pleasant feature. Hand-made tiles from Swallows, of Cranleigh, were selected as being in quiet harmony with the surroundings. The contractors were Messrs. Chapman, Lowry, and Puttick, Limited, of Haslemere; and the architects, Messrs. Alfred H. Hart and P. Leslie Waterhouse, of 1, Verulam Buildings, Gray's Inn, W.C. The illustration is reproduced from the drawing now being exhibited at the Royal Academy.

BOYS' GARDEN CITY, WOODFORD BRIDGE, ESSEX.

This extensive re-housing scheme in connection with Dr. Barnardo's Homes was commenced some few years before the war, a fine and beautifully wooded estate having been acquired at Woodford Bridge for the project. The land being of a rolling character, a very picturesque result has been achieved, and we shall look forward with interest to the buildings being further proceeded with. The Mansion House which was on the property has been utilised for the residence of the Governor and the Administration. The houses are planned to accommodate thirty boys, each comprising dining-room, playroom, dormitories, and kitchen and the usual offices. The illustration is of two types of the houses which have been erected. The architect is Mr. William A. Pite, F.R.I.B.A. The drawing reproduced herewith is now at the Royal Academy Exhibition.

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION.

These typical examples of one-story cottages are fully described in Mr. Robert Thomson's first article on page 434. The series will be continued next week and till concluded.

A memorial has been erected at Lyallpur to the makers of the Chenab Canal. The design is in the Renaissance style, executed in Gwalior stone; the fountain is in the centre of the pavilion, and around are seats for the convenience of the public. The design is the work of Mr. B. M. Sullivan, the Consulting Architect to the Government of the Punjab.

Bombardier W. T. Driscoll, City of London Artillery, a junior corresponding clerk in the City Surveyor's Office at Guildhall, has been killed in action. By seniors and colleagues he was held in high esteem as a loyal officer, an ever-willing worker, and a genial associate. Joining up at the outbreak of the war, he had been in France for two years. In his regiment he had received recognition in despatches.

CANADIAN LAW OF PRIVILEGE OF BUILDERS.

At the last session of the Legislature of the Province of Quebec some very important changes were effected in the privileges accorded to workmen, suppliers of materials, builders and architects, on the property of which the value has been increased by their work or materials.

To devise a satisfactory law of builders' privilege is not an easy task. There are several interests which may conflict—that of the workman, that of the supplier of materials, that of the builder and that of the owner. The task is rendered more difficult by the attitude of many principal contractors and owners, who seem to regard the registration of privileges not merely as burdens placed on the properties in which they are interested, but as in very deed hostile acts warranting immediate reprisals by way of loss of contract or otherwise. The supplier of materials and the sub-contractor is often between the Scylla and Charybdis—fearful of losing his rights as a privileged creditor if he does not register and fearful of losing at least the goodwill of the principal contractor, the architect and the owner if he does.

The manufactures of the amended law in Quebec are described in an address given recently at a luncheon at the Montreal Builders' Exchange, and is thus summarised by a writer in the *Contract Record*:—

The new law, as did the old, gives to the workman, the supplier of materials, the builder and the architect a right of privilege over other creditors on the immovable, but only to the extent to which their work and materials have enhanced its value.

NEW LAW CHANGES ORDER OF PRECEDENCE.

A change made affects the order of those entitled to the privilege. Under the old law the order of precedence was as follows:—The labourer, the workman, the architect, the builder, the supplier of materials. Under the new the labourer and workman are combined, the word "workmen" being used to designate "the artisan, the labourer and generally everyone who makes his living by manual labour." Next comes the supplier of materials; next the builder, which term includes both contractor and sub-contractor; and last the architect.

The privilege of the workman exists for arrears up to twenty days, whether he was engaged by a proprietor putting-up a building for himself or by a contractor. No formality is necessary for the creation or preservation of this privilege, and it lasts until thirty days after the construction is ready for the use for which it is intended. Within this thirty days the workman must sue his debtor, who will usually be the contractor or a sub-contractor, and he must call the proprietor and the registrar into the case.

In order to protect the proprietor against this undisclosed hypothec or mortgage on his property the law allows him to retain on the contract an amount sufficient to pay these privileged claims.

The supplier of materials is given a privilege on the building in which the materials supplied to the owner or builder have been used or for the construction of which they have been specially prepared.

The privilege is created by the registration of a notice given to the creditor or his representative, and applies only to those furnished or specially prepared, but not delivered, for the immovable in question. The law offers one striking novelty. It gives the supplier of materials a privilege for the price of materials specially prepared for a building, although they have not been delivered on the job or incorporated into the building. The law also grants to the unpaid supplier a right to revendicate, in case of the insolvency of owner or builder, the materials he has supplied, so long as they have not been incorporated in the building.

SUPPLIER OF MATERIALS HAS MORE RIGHTS.

The old law merely directed the supplier to advise the proprietor of the contracts made by him for the delivery of materials before they were delivered, mentioning their cost and the immovable for which they were intended. Failure to give this notice lost the supplier his privilege. The old law further provided that, in order to meet the privileged claims of the supplier of materials, the proprietor was entitled to retain on the contract price an amount equal to that mentioned in the notices he had received. The supplier, to retain his privilege, must now sue his debtor within thirty days of the date at which the construction is ready for the purpose for which it was intended. Under the old law the supplier had to sue within three months of the giving of the notice to the proprietor if he desired to retain his privilege. This often brought about an absurd state of affairs, in that the delay for suit had often expired before the merchandise had been used or even before all of it had been delivered.

In many cases—perhaps in most—the sub-contractor is also a supplier of materials. In such event he should conduct himself as such, giving what notices are required.

In the event of being merely a sub-contractor, to create this privilege he must advise the proprietor of the contract he has made with the principal contractor, and within thirty days after the end of the work he must register his claim and give notice to the proprietor. He only gets a privilege for the work he does subsequent to the notice that he has given the proprietor of his contract with the principal contractor. In other words, the creation of his privilege is subjected to two conditions—first, a condition precedent; the notice to the proprietor of the subs' contract with the principal contractor; second, a condition subsequent: the registration of a statement of his claim within the stated delay. Within six months after the end of the work a suit must be taken or the privilege will become extinct.

The proprietor may retain, on the contract price, sufficient to meet the claims of the sub-contractor. Under the old law the sub-contractor was obliged, in order to create his privilege, to advise the proprietor of his contract with the principal contractor within eight days of its signing, and, if he failed so to do he lost his privilege. The new law is fairer and less rigorous.

THE BUILDER AND ARCHITECT'S CLAIM.

The builder or the architect's claim is created by the registration within thirty days after the end of the work of a statement of claim of which notice is given to the proprietor within the same delay.

PROCEDURE.

As far as the workmen's claim is concerned, no notice or registration is necessary, but the workman must take a suit against the debtor within a delay of thirty days after the end of the work. In this suit the proprietor and the registrar must be brought in, the proprietor because his property is sought to be charged, the registrar so that he can make note of the suit in his books, and thus give warning of the existence of the privilege to anyone proposing to buy or lend money on the property. In order to obviate a multiplicity of suits for small sums, the law provides that several workmen may join in one action.

In dealing with the procedure involved in this department of law it will be noted that two basic requirements are laid down—notice to the proprietor of the immovable and registration. The notice to the proprietor is to advise him of the rights which are being created against his property, the registration is to advise those desiring to deal with the owner concerning the property or with the builder, of the situation.

Following out these principles, we have seen that the supplier of materials obtains his privilege only upon the registration of a notice which has been given to the proprietor, and applies only to those supplies furnished or specially prepared and not delivered, after the registration of such notice.

The privilege so created will become extinguished after thirty days after the end of the work unless the supplier takes a suit meanwhile, into which he must call the proprietor and the registrar.

SUB-CONTRACTOR'S COURSE OF ACTION.

The sub-contractor, to create his privilege, must, as we have seen before, advise the proprietor of the contract he has made with the

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principal contractor. I believe it would be well to have this notification to the proprietor served by a bailiff, or, if the mails are used, sent certainly by registered letter. Registration, in the registry office, must follow within thirty days of the end of the work.

An amendment of article C.C. 2103 repeats some of the provisions already enacted, but conveniently and clearly sets forth the essential characteristics of the notice or memorial of the creditors' claim: (a) The claim must be drafted in the form of an affidavit of the creditor or his representative and sworn to before a Justice of the Peace, a Commissioner of the Superior Court, or a notary; (b) it must contain the name, occupation and residence of the creditor, the nature and amount of the claim, and the cadastral number of the immovable upon which the construction is being placed.

The following practice will meet fully the requirements of the law and also be found convenient:—That the claim be prepared in triplicate. That at the foot of the claim there be appended a notice to the proprietor, drawing his attention to the claim, and a further notice to the registrar, requiring its registration. Let the claim and notice be served on the proprietor by a bailiff, and then put before the registrar both the remaining documents, asking him to affix his certificate of registration to both. Then file with him the document which does not bear the bailiff's return or affidavit of service, and retain the one which does. The privileged creditor will thereupon have in his possession a copy of his claim bearing upon it satisfactory proof of its having both been served and registered.

CANCELLATION OF PRIVILEGE.

A further amendment which has been made, and which will prove useful, is the following:

After the expiration of six months after the date of the registration of any privileged claim or from that date of the end of the work, whichever be the latest, if no action has been taken to preserve it, any interested party may call upon the registrar to radiate the privilege by the following procedure:—

The party interested prepares an application to the registrar demanding the cancellation, on the ground that the six months from the end of the work or the registration of the claim, whichever be the latest, has expired; this application he supports by his affidavit. Then, in order that an opportunity be afforded to the privileged creditor to take such steps as he may deem necessary to protect himself, this application must be served on the privileged creditor or his representative eight days before it is filed with the registrar.

If a suit has been taken the registrar is bound to radiate the registration not only by direction of a judgment, which might go without saying, but also on production of a certificate from the prothonotary that the action has been discontinued.

CONCRETE SHIPS.

Boats were first built of reinforced concrete a number of years ago. Some engineers have always believed that there is a great future before this method of construction, but examples seen hitherto have been crude and heavy; cheaper to build, but most costly to propel on account of their weight. They have been used to a considerable extent in Norway, and also in the Panama Canal zone, where their employment seems not to have been an unqualified success. Improvements in concrete boats, which the inventor believes will turn the balance in their favour, are announced by Carl Weber, of Chicago, in an article printed in the "American Marine Engineer" (Norfolk, Va.). Mr. Weber believes that the principal faults of previous attempts have been that concrete builders tried to use every-day methods and means in design and mixing and applying the materials. He thus describes two methods which have been used:—

"The first method consists in building an inside and outside form for the ship's hull, and between these forms (which were separated to allow for intended wall thickness) the necessary reinforcement was placed. Then a concrete, composed of Portland cement, sand, and crushed stone, or gravel was poured in a semi-liquid condition to fill the forms and to encase the steel reinforcement. After the concrete had sufficiently hardened the forms were removed and the barge was finished by pouring bulkheads, division walls, and decks, etc., in a similar manner.

"This method resulted in extremely clumsy and heavy vessels, which can only be used for sand and construction barges.

"The second method consists in using a light steel skeleton, placing over the outside of the same an expanded metal or wire fabric and finishing the hull by plastering over this sheathing a rich mortar coating in the same manner as light curtain and partition walls are formed in fireproof building construction.

"This method is a great improvement over the first one, but can only be used for smaller boats, launches, etc., and, of course, it is practically out of the question for freight barges."

Mr. Weber's new method of construction, which, he claims, combines the advantages of these while eliminating their faults, he calls "Torcrete." He writes:—

"The ship's hull consists of a strong framework of steel which is so designed that the combined strength and advantages of steel and concrete are fully recognised. This truss frame is erected and riveted in the ordinary manner. In the completed ship the steel frame is entirely encased in concrete, and thereby protected against rusting. By this encasing the steel members are also stiffened and the 'buckling' stresses are greatly reduced. For this reason the steel members of the frame are of simple design relatively light in weight.

"After the steel frame is completed, it is covered with my 'Multiple-Unit' wall construction of varying thickness. The walls are formed of a high-grade concrete applied by compressed air, and each section is independently reinforced by networks of light steel bars and wire mesh. All ship walls, bulkheads, decks, and partitions are formed in a similar manner without the presence of any construction of connection joints, so that the completed ship is one seamless, monolithic structure. . . .

"The material is applied in even and uniform layers by means of a powerful stream of compressed air. . . .

"After the last coat of 'Torcrete' has sufficiently hardened, the outer surfaces are rubbed down to an even, smooth finish with rotary compressed air-driven grinders, and the entire ship may be painted as usual."

PLASTER HAS EFFECT ON QUIET CONDITIONS IN BUILDINGS.

One of the important factors in producing quiet conditions in buildings has been determined by prominent architects to be the kind of plaster that is applied to the walls, states the *American School Board Journal*. When a sound-wave strikes a wall the following occurs:—Part of the sound is absorbed, part is transmitted, and part is reverberated, the volume reverberated and transmitted being dependent entirely upon the volume absorbed, and the volume absorbed is, in turn, dependent upon the character of the plaster. A dense, smooth surface will reflect sound waves much more readily than a material that is porous, as a dense surface absorbs very little of the sound-wave at each impact, and many reflections are necessary before it dies out, and in many auditoriums it has developed that an overlapping of syllables has persisted for several seconds after the source of sound has ceased. On the other hand, a surface porous in nature will absorb a greater quantity of energy at each impact, and sound quickly dies away. It will, therefore, be seen that the ideal material for plastering the interior of school buildings, from the view point of acoustics and quiet conditions, would be that which reduces reverberation of sound waves to a minimum.

There are two kinds of plaster in general use to-day—viz., gypsum hard wall plaster and hydrated lime plaster. There is, however, one great advantage in favour of hydrated lime plaster—its ability to absorb and deaden sound—and it is this advantage which is now recognised by the architect and impelling him to accept hydrated lime plaster as the standard plaster for such buildings as school buildings, where good acoustics or quiet conditions are desirable.

Gypsum plaster, when passing through the process of hardening on the wall, takes up in chemical combination approximately 25 per cent. water. This chemical addition causes the plaster to "set" or crystallise, each particle becoming firmly united to its nearest particle. When this action is completed, there results a panel of plaster which is dense, hard, and brittle. Hydrated lime plaster hardens in an entirely different manner, this process being dependent upon the carbon dioxide in the atmosphere combining with the lime in the plaster, and this combination drives off all the water that was used in mixing the plaster. The mixing water originally required space, and this water, being driven off, leaves the hardened plaster with millions of tiny, dead air cells. These air cells are absorbers of sound, and when a sound-wave strikes the wall, a large majority of it is absorbed, thus reducing to a minimum the reverberation which provides defective acoustics in a room or auditorium.

The durability of hydrated lime plaster cannot be questioned when one considers that for years it was the only plastering material on the market. Many readers probably well remember the days of construction when no other material was used for plaster except lump lime, sand, and hair, and these jobs are still standing to-day in an excellent state of preservation. Hydrated lime plaster accomplishes the same fine results that were formerly gained by the use of lump lime. The old disadvantages of lump lime, such as pitting and popping, and the expense and inconvenience of slaking are eliminated with the use of hydrated lime. The material is delivered on the job all ready for the immediate addition of sand and water, and in some cities it is mixed with the sand at a mixing plant and delivered ready for mixing with water. The covering capacity of hydrated lime plaster is the same as that of gypsum plaster.

Building Intelligence.

BURSTON.—The village of Burston, Norfolk, was the scene of a lively demonstration on Sunday week in connection with the opening of the new "strike" school. The building abuts upon the village green, and the premises and playground are adjacent to the churchyard. It is a substantial structure, 36 ft. by 24 ft. The front is faced with Bath stone, and the brick work at ends and back with cement and shingle. The building is lofty and well lighted. A number of inscriptions are cut upon stones in the front. One reads:—Mr. T. G. Higdon and Mrs. A. K. Higdon were unjustly dismissed from the Council school of this village on the 31st day of March, 1914. This building was erected by public subscriptions to protest against the action of the Education authorities to provide a free school to be a centre of rural democracy and a memorial of the villagers' fight for freedom." There are something like eighty-three subscribers towards the memorial stones, which take up a considerable portion of the frontage of the building. The building is expected to be available for teaching in about a month or six weeks' time. In the meanwhile the school is being conducted in a temporary structure which has been placed on the green, and has been used for that purpose for some months past.

CHICHESTER—A report on the County Hall, Chichester, with the view of adapting the premises for the use of the Council, has been made by Mr. Clyde Young and adopted by the West Sussex C.C. Plans will be prepared for the work in connection with the electrical installation, etc., so that the cost may not exceed £500. The architect has been instructed to prepare sketch plans of the additional office buildings, etc., to provide for the complete concentration of all the county departments.

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PROFESSIONAL AND TRADE SOCIETIES.

ROYAL VICTORIAN INSTITUTE OF ARCHITECTS.—According to the annual report of the Royal Victorian Institute of Architects, several new members have been admitted during the war, while the roll has been depleted by deaths and other causes. The membership at the close of the year was as follows:—Fellows, 70; as against 71 a year ago. Hon. Fellows, 2; as against 3. Associates, 52; as against 53. Students, 30; as against 21 last year. It will be noted that, so far, the trying times have not materially affected the membership. During the session, the following general meetings were held, and papers read:—Tuesday, March 28: Holophane Illumination, by H. V. Mackinney. Tuesday, May 30: "A Week with the Architectural Association Before the War," by Walter R. Butler (F.), F.R.I.B.A. Tuesday, August 1: "The Fundamental Principles of Town Planning," with lantern illustrations, by J. C. Morrell (F.), A.R.I.B.A. Tuesday, September 26: Discussion of matters arising out of the war. Tuesday, December 12: "Grading and Classification of Australian Timbers," by Louis C. Moore (Jas. Moore and Co.) Obituary.—The Council regretted to have to record, besides the death of Mr. John Little, the Secretary and Editor, that of Lieut. A. S. Williams (A.), who was killed in France, fighting for his King and country, on July 22, 1916. During the past year the number of members on active service had increased from 6 to 15, and the number of Students from 44 to 60. A Conference on Australian timbers, forestry and re-afforestation, initiated by the Institute, under the direction of Mr. Blackett as President, was taken up by those interested and lasted for three afternoons and one evening, in November, when practical and interesting papers were read and discussed. At its conclusion, a resolution was passed urging the Government to introduce a Bill, placing forestal control under a board of expert commissioners. Financial Report.—From the balance-sheet it appears that the financial year was commenced with a debit balance on the Commercial Bank account of £28 5s. 5d., which had increased by the end of the year to £55 19s. 5d. The debit was chiefly due to an expenditure of £40 16s. 4d. in addition to the £174 spent last year, on furniture, portraits, books, for the library, and so on, for the new room, which should have been paid out of reserves, but as these funds, amounting to £322 16s. 2d., were invested on fixed deposit, they could not be operated upon.

SOCIETY OF ANTIQUARIES.—At the last monthly meeting of the Society of Antiquaries of Scotland Sir Herbert E. Maxwell, Bart., F.S.A.Scot., gave an account of the rediscovery of the third of the inscribed monuments at Kirkmadrine, bearing the Chi Rho monogram, the existence of which had been known to antiquaries since about 1870 from a sketch which the late Sir Arthur Mitchell obtained shortly before that date from Mr. William Tod, an old schoolmaster in the parish of Kirkmaiden. This sketch had been made by Mr. Tod about fifty years previously. The stone, which had completely vanished, and was believed to be irretrievably lost, was recently discovered built into the centre of a gate pillar at the United Free Church manse of Stoneykirk, and supporting one of the crooks of the gate. It is of greywacke, and bears in Anglo-Roman capitals the inscription, "Initium et Finis," and, within a circle, the monogram originally displayed on the labarum or standard of the Emperor Constantine. This is the fourth stone bearing this device existing in Scotland, all of them in the county of Wigtown. The Chi Rho monogram first appears in the catacombs of Rome in connection with inscriptions executed early in the fourth century, while in France it occurs only on monuments dated between A.D. 377 and 540. It was suggested that the progress westward of Christian symbolism might have been accelerated by the mission of Bishop Ninian, and that these stones might be of as early a date as the end of the fourth or the beginning of the fifth century.

OBITUARY.

Lieutenant-Colonel Walter W. Stewart, the well-known architect, of Hamilton, Ont., who went overseas in command of the 86th Machine Gun Battalion, has been reported killed in action. The late Colonel Stewart was born in Covington, Ky., about forty-six years ago. As a child he went with his parents to Toronto, and later to Hamilton, where he had since resided. He studied architecture under his father, and later took a course at Cleveland, Ohio, where he graduated. Returning to Hamilton, he entered into partnership with his father, and, upon the latter's death, formed a partnership with W. P. Witton. They planned a number of public schools and other large buildings in Hamilton, among them the new Armories and the Collegiate Institute, and were recognised as one of the city's leading firms of architects.

Mr William Rotch Ware, who was editor of the *American Architect* during thirty-one years, and under whose hand it grew from the modest little journal illustrated with scanty pen outline lithograph drawings into its present form, has just passed away, at the age of sixty-nine years, at his home at East Milton, Mass. Mr. Ware, who was born in 1848, was one of the first Americans to go to the Ecole des Beaux Arts. He returned to America from the Beaux Arts to find Boston a heap of smoking ruins from the great fire in Summer Street. His uncle urged him—just engaged to be married—to take the assistant editorship of the *American Architect*, under Mr. William P. P. Longfellow, brother of the poet. He did so, and ultimately succeeded Mr. Longfellow as editor-in-chief. Mr. Ware published various monographs of American architecture—"Renaissance Doorways," "Door and Window Grilles," "Ecclesiastical Domes," and "Topical Architecture," which appeared monthly. He wrote an exhaustive treatise on Equestrian Monuments, on which subject he gave an interesting series of lectures at the Lowell Institute. But his chief work was "The Georgian Period." Mr. Ware was a member of the Society of Beaux Arts Architects and the Boston Society of Architects.

We regret to note the death of Lieut. Philip Martin Blake Collcutt, East Yorkshire Regiment, killed in action, on May 12, younger son of Mr. T. E. Collcutt, F.R.I.B.A., of Bloomsbury Square, and Totteridge, Herts.

The ancient church of the Holy Trinity at Old Clee was in danger from fire on Friday evening. Happily the outbreak, which originated in the vestry, was discovered early, and the prompt arrival of a motor engine from Grimsby enabled the fire to be got under before serious damage was done. The church was dedicated by Hugh, Bishop of Lincoln, in 1192.

The Dudley Education Committee has decided to request the town council to make arrangements for the purchase from the Earl of Dudley of 8,599 square yards of land in the Ednam Road for the proposed new technical school. It is proposed to pay a deposit on the purchase money of the site, and at once proceed to complete the joint scheme, so that building operations may be commenced as soon after the termination of the war as possible.

"Drat yer, get out!" is a maternal command which the Director of Education in Liverpool has frequently heard addressed to boys in the homes among the congested parts of the city. Thus the boys are sent out into the streets to fall into mischief, while the girls may be kept indoors to assist in domestic duties. Mr. Legge believes that by better housing and a multiplication of juvenile recreation grounds crime among boys would be eradicated in a dozen years.

A proposal is on foot to acquire the old Grammar School House in St. John Street, Lichfield, for the purpose of offices for the Lichfield Rural District Council and Board of Guardians. The house and the old school building, which stands in the garden, have many interesting associations. Dr. Johnson, Elias Ashmole, David Garrick, and Joseph Addison received their education there, in addition to five High Court judges who were at the school together, and who afterwards sat on the Bench simultaneously.

Our Office Table.

Splendid tributes were paid at last Thursday's meeting of the Liverpool Health Committee to the work and character of the late Mr. Wm. Goldstraw, for thirty years building surveyor to the corporation. Alderman Muirhead and Alderman Taggart, on behalf of the committee, and the town clerk, on behalf of the staff, voiced the widely-felt sorrow at the passing away of the high-minded and thoroughly efficient public servant, and a resolution of condolence with the bereaved family was passed.

The council of the Roads Improvement Association, of which Prince Arthur of Connaught is president, at a meeting held in London last week, resolved to act upon a recommendation that investigations should be made forthwith into the claims of concrete roads. The council of the Association is in possession of much interesting data, from America and elsewhere, concerning the economy and durability of concrete roads with reinforced concrete foundations. Instructions have now been given by the Association for a report to be prepared and presented by Mr. H. Percy Boulnois, M.Inst.C.E., formerly city engineer of Liverpool and deputy chief engineering inspector to the Local Government Board.

The annual summer meeting of the Institution of Water Engineers will be held in London on Friday, June 22, commencing at 2.15 p.m. A paper entitled "Colour Records Applied to Potable Waters" will be presented by Mr. J. S. Pickering, M.Inst. C.E., of Cheltenham (past-president), and a discussion on "Water Supplies as Sources of Power" will be introduced by Mr. Cecil H. Roberts, M.Inst.C.E., of Aberdeen (member of the council). The premiums awarded by the council for papers read during the year 1916 will be presented to the respective authors, and the president will read a short report on the past year's working.

1.—On November 9, 1915, the London County Council, on the recommendation of the War Estimates Committee, decided that the printing of all statistical and other annual returns should be suspended. The Building Acts Committee have had under consideration the question of printing the annual report for 1916 by the superintendent architect submitting a summary of the monthly returns of district surveyors. Copies of the return are supplied to the metropolitan borough councils, district surveyors, and to the revenue authorities in connection with the payment of income-tax by district surveyors. The estimate for printing is £7, and they are advised that it would be more economical for the report to be printed at once, than for typed copies now to be made and the printing to be done at a later date. On April 18, 1916 (p. 374), the Council authorises the printing of the return for 1915, and the return for 1916 should also be printed. It is recommended that the operation of the resolution of November 9, 1915 (p. 444), as to printing annual returns, be suspended to enable the Council to consider the following recommendation: That the sixty-first annual report by the superintending architect, submitting a summary of the monthly returns of district surveyors, be printed.

TRADE NOTES.

Boyle's latest patent "Air-Pump" Ventilators, supplied by Messrs. Robert Boyle and Son, Ventilating Engineers, 64, Holborn Viaduct, London, have been employed by the Rowley Regis Urban District Council, Old Hill, Staffordshire.

The pumping station connected with the sewerage at Bedford, which hitherto was a source of trouble owing to flooding in the rainy season, has now been remedied with Pudlocd cement. Our informant writes that the engineer has expressed his appreciation at the result, as the situation of the work presented great difficulties.

The Board of Education have approved plans for a new council school at Barlby, Selby.

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LATEST PRICES.

N.B.—All prices must be regarded as merely approximate for the present, as our usual sources of information are in many cases failing us.

TIMBER.

Owing to stoppage of supplies all prices have advanced considerably.

IRON.

Rolled Steel Joists, English.....
Compound Girders, Ordinary Sections .....
Compound Stanchions .....
Angles, Tees, Channels and Flitch Plates .....
Wrought-Iron Girder Plates ....
Steel Girder Plates .....
Steel Sheets (Single or Double) ..
Steel Strip .....
Basic Bars .....
Mild Steel Bars .....
Steel Bars, Ferro-Concrete Quality (basis price) .....

} Prices controlled by Ministry of Munitions.

	Per ton.		Per ton.
Bar Iron, good Staffs	£16 0 0	to	£17 0 0
Do., Lowmoor, Flat, Round, or Square, to 3½ cwt.	24 0 0	,,	—
Do., Staffordshire Crown	16 0 0	,,	16 10 0
Boiler Plates, Iron—			
South Staffs	8 0 0	,,	8 15 0
Best Sneedshill	9 0 0	,,	9 10 0
Angles, 10s., Tees 20s. per ton extra.			
Builders' Hoop Iron, for bonding, £18 10s. to £19 10s.			
Ditto galvanised, £32 to £32 10s. per ton.			
Galvanised Corrugated Sheet Iron—			
	No. 18 to 20.		No. 22 to 24.
6ft. to 8ft. long, inclusive gauge	Per ton. £30 0 0	to	Per ton. £30 10 0
Best ditto	32 0 0	,,	32 10 0
Cast-Iron Columns	13 10 0	,,	14 0 0
Cast-Iron Stanchions	13 10 0	,,	14 0 0
Rolled-Iron Fencing Wire	8 15 0	,,	9 5 0
Rolled-Steel Fencing Wire	7 15 0	,,	8 0 0
,, ,, ,, Galvanised	6 5 0	,,	6 15 0
Cast-Iron Sash Weights	7 0 0	,,	7 10 0
Cut Floor Brads	24 0 0	,,	24 5 0
Corrugated Iron, 24 gauge	27 0 0	,,	28 0 0
Galvanised Wire Strand, 7 ply, 14 B.W.G.	14 5 0	,,	—
B.B. Drawn Telegraph Wire, Galvanised—			
0 to 8	9 10	11 12	B.W.G.
£10 10s.	£10 15s.	£11 0s. £11 5s.	£11 15s. per ton
Cast-Iron Socket Pipes—			
3 in. diameter	£7 5 0	to	£7 12 6
4 in. to 6 in.	7 0 0	,,	7 2 6
7 in. to 24 in. (all sizes)	7 7 6	,,	7 12 6
[Coated with composition, 5s. 0d. per ton extra. Turned and bored joints, 5s. per ton extra.]			
Pig Iron—	Per ton.		
Cold Blast, Lilleshall	177s. 6d.	to	182s. 6d.
Hot Blast, ditto	115s. 0d.	,,	125s. 0d.
Wrought-Iron Tubes and Fittings—Discount off Standard Lists f.o.b. (plus 2½ per cent.)—			
Gas-Tubes	52½ p.c.		
Water-Tubes	47½ ,,		
Steam-Tubes	42½ ,,		
Galvanised Gas-Tubes	35 ,,		
Galvanised Water-Tubes	26½ ,,		
Galvanised Steam-Tubes	20 ,,		

OTHER METALS.

A licence must be obtained from the Director of Materials (A.M. 2 (E)), Hotel Victoria, Northumberland Avenue, S.W., and should accompany orders for quantities over 1 cwt.

	Per ton.		Per ton.
Lead Water Pipe, Town	*£39 0 0	to	—
,, ,, ,, Country	*40 0 0	,,	—
Lead Barrel Pipe, Town	*40 0 0	,,	—
,, ,, ,, Country	*41 0 0	,,	—
Lead Pipe, tinned inside, Town	*41 0 0	,,	—
,, ,, ,, ,, Country	*42 0 0	,,	—
Lead Pipe, tinned inside and outside, Town	*43 10 0	,,	—
,, ,, ,, ,, Country	*44 10 0	,,	—
Composition Gas-Pipe, Town	*42 0 0	,,	—
,, ,, Country	*43 0 0	,,	—
Lead Soil-pipe (up to 4½in.) Town	*42 0 0	,,	—
,, ,, ,, ,, Country	*43 0 0	,,	—
[Over 4½in. £1 per ton extra.]			
Lead, Common Brands	26 0 0	,,	—
Lead, 4lb. sheet, English	38 10 0	,,	—
Lead Shot, in 28lb. bags	—	,,	—
Copper Sheets, Sheathing & Rods	168 0 0	,,	170 0 0
Copper, British Cake and Ingot	147 0 0	,,	150 0 0
Tin, English Ingots	285 0 0	,,	—
Do., Bars	186 10 0	,,	187 10 0
Pig Lead, in 1cwt. Pigs, Town	33 12 6	,,	34 12 0
Sheet Lead, Town	*38 10 0	,,	—
,, ,, Country	*39 0 0	,,	—
Genuine White Lead	*53 10 0	,,	—
Refined Red Lead	42 0 0	,,	—
Sheet Zinc	129 0 0	,,	—
Spelter	93 0 0	,,	110 0 0
Old Lead, against account	26 0 0	,,	—
Tin per cwt.	14 0 0	,,	—
Cut nails (per cwt. basis, ordinary brand)	1 5 0	,,	—

* For 5 cwt. lots and upwards.

SLATES.

	in.	in.	£ s. d.		per 1,000 of
Blue Portmadoc	20 × 10	..	11 17 6		1,200 at r. stn.
,, ,,	16 ,,	8 ..	6 0 0	,,	,,
First quality	16 ,,	10 ..	11 15 0	,,	,,
Blue Bangor	20 ,,	10 ..	12 0 0	,,	,,
,, ,,	20 ,,	12 ..	12 2 6	,,	,,
First quality	20 ,,	10 ..	11 15 0	,,	,,
First quality	20 ,,	12 ..	11 0 0	,,	,,
,, ,,	16 ,,	8 ..	6 0 0	,,	,,
Eureka unfading green	20 ,,	10 ..	15 17 6	,,	,,
,,	20 ,,	12 ..	18 7 6	,,	,,
,,	18 ,,	10 ..	13 5 0	,,	,,
,,	16 ,,	8 ..	10 5 0	,,	,,
Permanent Green	20 ,,	10 ..	11 12 6	,,	,,
	18 ,,	10 ..	9 12 6	,,	,,
	16 ,,	8 ..	6 12 6	,,	,,

BRICKS.

(All prices net.)

First Hard Stocks	£2 2 0	per 1,000	alongside, in
Second Hard Stocks	1 16 0	,,	,, [river.
Mild Stocks	1 14 0	,,	,, ,,
Picked Stocks for Facings	2 14 0	,,	delivered at rail'y. station.
Flettons	1 13 0	,,	,, ,,
Pressed Wire Cuts	1 18 0	,,	,, ,,
Red Wire Cuts	1 14 0	,,	,, ,,
Best Fareham Red	3 12 0	,,	,, ,,
Best Red Pressed Ruabon Facing	5 5 0	,,	,, ,,
Best Blue Pressed Staffordshire	5 7 0	,,	,, ,,
Ditto Bullnose	5 12 0	,,	,, ,,
Best Stourbridge Fire-bricks	7 0 0	,,	,, ,,
2½in. Best Red Accrington Plastic Facing Bricks	4 10 6	,,	Net, delivered in full truck loads London.

Per 1,000

3½" Accrington Best Red Plastic Facing Bricks	£2 10 0
3½" ditto Second Best Plastic ditto	2 2 6
Ditto Ordinary Secondary Bricks	1 11 3
Ditto Plastic Engineering Bricks	1 17 6
Sewer Arch Brick, not more than 3½ in thickest part	£2 0 0
3½" Chimney Bricks fit for outside work	2 6 0
3½" ditto ditto through and through	2 0 0
3½" Beaded, Ovolo and Bevel Jambs; Octagons; 2½" and ½" radius Bullnoses; Stock patterns	3 7 6
Accrington Air Bricks, 9" × 2 course deep, each	0 0 6
Ditto ditto 9" × 1 course	0 0 3

Accrington Camber Arches:—

3 course deep	4½"	soffit, per foot opening	..	0 1 3
4	,,	4½"	,,	,,	..	0 1 8
5	,,	4½"	,,	,,	..	0 2 1
6	,,	4½"	,,	,,	..	0 2 6
3	,,	9"	,,	,,	..	0 2 1
4	,,	9"	,,	,,	..	0 2 11
5	,,	9"	,,	,,	..	0 3 6
6	,,	9"	,,	,,	..	0 4 6

Net free on rail, or free on boat at works.

GLAZED BRICKS.

HARD GLAZES (PER 1,000).

White, Ivory, and Salt Glazed.	Best. Buff, Cream, & Bronze.	Other Colours.	Seconds Coleurs.
Stretchers—			
£14 17 6	£13 17 6	£16 7 6	£20 7 6	£15 7 6
Headers—			
14 7 6	13 7 6	15 17 6	19 17 6	14 17 6
Quoins, Bullnose, and 4½in. Flats—			
18 7 6	17 7 6	20 7 6	23 17 6	18 17 6
Double Stretchers—			
20 7 6	19 7 6	23 7 6	26 17 6	20 17 6
Double Headers—			
17 7 6	16 7 6	20 7 6	23 17 6	17 17 6
One side and two ends, square—			
21 7 6	20 7 6	24 7 6	28 17 6	21 17 6
Two sides and one end, square—			
22 7 6	21 7 6	25 7 6	29 7 6	22 17 6
Splays and Squints—			
19 17 6	18 17 6	24 7 6	27 7 6	20 7 6
Stretchers cut for Closers—			
15 17 6	14 17 6	17 7 6	21 7 6	16 7 6
Nicked Double Headers—			
18 7 6	17 7 6	21 7 6	24 17 6	18 17 6

Compass Bricks, Circular and Arch Bricks, not exceeding 9 × 4½ × 2½ in., of single radius, £6 per 1,000 over and above list for their respective kinds and colours.

The following prices of Special Bricks are plus 25 %:—

Plinth and Hollow Bricks, Stretchers and Headers—
5d. each 4d. each 6d. each 6d. each 5d. each

Double Bullnose, Round Ends, Bullnose Stops—
5d. each 4d. each 6d. each 6d. each 5d. each

Rounded Internal Angles—
4d. each 3d. each 5d. each 5d. each 4d. each

Camber Arch Bricks, not exceeding 9 × 4½ × 2⅞ in., any kind or colour, 1s. 2d. each.

MOULDED BRICKS.

Stretchers and Headers—
8d. each 8d. each 8d. each 8d. each 8d. each

Internal and External Angles—
1/2 each 1/2 each 1/2 each 1/2 each 1/2 each

Sill Bullnose, Stretchers, and Headers—
5d. each 4d. each 6d. each 6d. each 5d. each

Majolica or Soft Glazed Stretchers and Headers	Per 1,000 £25 7 6
,, ,, Quoins and Bullnose	30 7 6

These prices are carriage paid in full truck loads to London Stations.

SAND AND BALLAST.

	s.	d.	
Thames Sand	8	3	per yard, delivered.
,, Ballast	8	3	
Pit Sand	9	6	,, ,,
Best Washed Sand	10	0	,, ,,

CEMENT AND LIME.

	s. d.	s. d.	Per ton,
Best Portland Cement	45 0	to 48 0	delivered.
Ground Blue Lias Lime	25 6	per ton,	delivered.

Exclusive of charge for sacks.

	s. d.	s. d.	Per yard.
Grey Stone Lime	18 0	to 18 6	delivered,

Stourbridge Fireclay in sacks 35s. 0d. per ton at railway station.

STONE.*

	£ s. d.
Yellow Magnesian, in blocks .. per foot cube	0 3 3
Red Mansfield, ditto ,,	0 2 9
White Mansfield, ditto ,,	0 2 9
Red Corsehill, ditto ,,	0 2 6
Darley Dale, ditto ,,	0 2 5
Greenshill, ditto ,,	0 2 4
Closeburn Red Freestone, ditto ,,	0 2 2
Ancaster, ditto ,,	0 2 0
Beer Stone, delivered on rail at Seaton Station ,,	0 1 1
Ditto, delivered at Nine Elms Station ,,	0 1 7½
Chilmark, ditto (in truck at Nine Elms) ,,	0 1 10½
Hard York, ditto ,,	0 2 0
Do. do. 6 in. sawn both sides, landings, random sizes ..... per foot sup.	0 2 5
Hard York, 3 in. slab sawn two sides, random sizes ..... per foot cube	0 1 0
Bath Stone—Delivered in railway trucks at Westbourne Park, Paddington (G.W.R.), or South Lambeth (G.W.R.) per cube foot	0 1 7
Delivered in railway trucks at Nine Elms (L. & S.W.R.) .. ,,	0 1 8½
Delivered on road waggons at Nine Elms Depot ..... ,,	0 1 9½
Portland Stone—Brown Whitbed in random blocks of 20 ft. average, delivered in railway trucks at Westbourne Park (G.W.R.), South Lambeth (G.W.R.), or Nine Elms (L. & S.W.R.) ..... ,,	0 2 5½
Delivered on road waggons at Pimlico Wharf or Nine Elms Depot ..... ,,	0 2 6½
White Basebed—2d. per foot cube extra.	

* All F.O.R. London.

TILES.

	s.	d.		Divrd.at
Plain red roofing tiles	42	6	per 1,000	ry. stn.
Hip and Valley tiles	5	6	per doz.	,,
Broseley tiles	52	6	per 1,000	,,
Ornamental tiles	55	0	,,	,,
Hip and Valley tiles	5	6	per doz.	,,
Ruabon red, brown, or brindled ditto (Edwards)	57	6	per 1,000	,,
Ornamental ditto	60	0	,,	,,
Hip tiles	4	0	per doz	,,
Valley tiles	3	0	,,	,,
Selected "Perfects" roofing tiles: Plain tiles (Peake's)	46	0	per 1,000	,,
Ornamental ditto	48	6	,,	,,
Hip tiles	3	10½	per doz.	,,
Valley tiles	3	4½	,,	,,
"Rosemary" brand plain tiles	48	0	per 1,000	,,
Ornamental tiles	50	0	,,	,,
Hip tiles	4	0	per doz.	,,
Valley tiles	3	8	,,	,,
Staffordshire (Hanley) Reds or brindled tiles	42	6	per 1,000	,,
Hand-made sand-faced	45	0	,,	,,
Hip tiles	5	6	per doz.	,,
Valley tiles	5	6	,,	,,
"Hartshill" brand plain tiles, sand-faced	45	0	per 1,000	,,
Pressed	42	6	,,	,,
Ornamental ditto	47	6	,,	,,
Hip tiles	4	0	per doz.	,,
Valley tiles	3	6	,,	,,

OILS.

Rapeseed, English pale, per tun	£28	15	0	to	£29 5 0
Ditto, brown ,,	26	15	0	,,	27 5 0
Cottonseed, refined ,,	29	0	0	,,	30 0 0
Olive, Spanish ,,	39	10	0	,,	40 0 0
Seal, pale ,,	21	0	0	,,	21 10 0
Coconut, Cochin ,,	46	0	0	,,	46 10 0
Ditto, Ceylon ,,	42	10	0	,,	43 0 0
Ditto, Mauritius ,,	42	10	0	,,	43 0 0
Palm, Lagos ,,	32	5	0	,,	33 5 0
Ditto, Nut Kernel ,,	35	0	0	,,	35 10 0
Oleine ,,	17	5	0	,,	19 5 0
Sperm ,,	30	0	0	,,	31 0 0
Linseed Oil per gal.	0	5	9	,,	—
Baltic Oil ,,	—			,,	—
Turpentine ,,	0	4	7	,,	—
Patty (Genuine Linseed Oil) per cwt.	0	14	9	,,	—

GLASS (IN CRATES).

English Sheet Glass	15 oz.	21 oz.	26 oz.	32 oz.
Fourths	5d. ..	6d. ..	7d. ..	8½d
Thirds	5½d. ..	6½d. ..	7½d. ..	9½d.
Fluted Sheet	5½d. ..	7½d. ..	— ..	—

Hartley's English Rolled Plate	⅛ in. 4d. ..	¼ in. 4½d. ..	⅜ in. 4¾d.

	White.	Tinted.
Figured Rolled	5d. ..	6½d.
Repoussine	4½d. ..	5½d.
Rolled Sheet	4½d. ..	—
Stippolyte	4½d. ..	—

The borough surveyor of Louth, Mr. G. H. Allison, has been instructed to prepare an estimate of the cost of converting part of the town hall buildings into a public mortuary.

Woodchester wayside cross is to be consecrated by the Bishop of Clifton on June 3, Trinity Sunday. The cross itself, with a large canopy, is the work of Messrs. Wall, of Cheltenham; the local work has been done by Mr. Drew; while the architect is Mr. Thos. Falconer, of Amberley.

Some time ago the salary of Mr. Arthur Asquith, surveyor and inspector of nuisances to the Holyhead Urban District Council, was increased by £10 per annum, but a letter from the Local Government Board intimates that Lord Rhonadda was of the opinion that unless there were very special reasons for making the increase it should be left over until the end of the war. The council decided to adhere to its resolution to increase the salary.

A ferro-concrete water tower recently completed at North Point, Ala., U.S.A., has an 80,000 gallon tank 30 ft. high and 22 ft. in diameter, supported on a single centre column 35 ft. in height. The column has an extended conical base to provide stable footing, and is hollow, containing the supply and discharge pipes for the tank above. Judging from the illustration of this tower given in *Contracting*, the builders have not made any attempt to produce a pleasing appearance.

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New Prudential Buildings, Leicester. Mr. Paul Waterhouse, M.A., F.R.I.B.A., Architect.

St. Wilfrid's Church, Duchy Road, Harrogate. View of choir. Mr. Temple Moore, F.R.I.B.A., Architect.

The Problem of the Small Dwelling and its Solution. Two pages of typical plans by Mr. Robert Thomson, Architect.

Currente Calamo.

The charges under the Defence of the Realm Act against the eight engineers' shop stewards were withdrawn at the Bow Street Police Court, London, last Wednesday. The men had signed an undertaking, and the Attorney-General said he felt hopeful for the future conduct of these national questions. At the same time he gave warning that the Government would not shirk the issue if raised again, and future offenders would be strictly dealt with. Sir Frederick Smith was solemnly impressive, but we should think he must have felt he was talking through his hat. All who have read the very fair article in the *Times* of yesterday week will have cleared their minds in regard to the strike, and, we think, will arrive at the conclusion that the Government itself was mainly responsible. The truth is that it ought to have needed no Defence of the Realm Acts to prevent strikes now or at any time. Long ago compulsory arbitration should have been made legal, with heavy penalties of purse and person for any strike or lock-out proclaimed before arbitration was invoked. Governments of all parties shirk the passing of a compulsory arbitration Act, because they fear to offend "labour," although the substantial increase of the minority in favour of it has grown yearly at recent Trade Union Congresses. Their officials irritate workmen into rebellion more stupidly than the most stupid private employer; and, of course, the Syndicalists also see the short road to political position successful trade union leadership furnishes, and seize the chance of making mischief on the old Jacobite principle, "Box it about, it will come to my Father!"

Lord Rhondda's reply to the deputation which, as we mentioned last week, waited on him yesterday week, was in the main suitably sympathetic—probably because he found he had sensible people to talk to, and was not asked to pledge himself to visionary schemes advocated by well-meaning enthusiasts, but to help as far as he could to remove the real obstacles to house-building. The proceedings were of the nature of a conversation between Lord Rhondda and the delegates, who asked that the Finance Act of 1909-1910 should be amended so that private enterprise might go on as before, and that the conditions which militated against the building industry should be removed. The question of the slums, it was suggested, would have to be dealt with separately. Government help would be necessary after the war in the shape of loans or special banking facilities if housing development was to go on. Lord Rhondda, in the course of the discussion, said he would be sorry to see private enterprise done away with, and he noted that their contention was that if want of confidence was removed and the Finance Act amended in the direction they suggested, private enterprise would again be restored and there would be no need for State aid. Members of the deputation pointed out that it would be necessary during any period of transition that followed the war. Lord Rhondda said they were apparently convinced there would be a transition period. Their claim was that during the transition period they should be put in the same position as any other building organisation, municipalities, or co-operative societies. They also, he understood, wanted banking facilities at the lowest possible market rates. He regarded the matter as a very urgent one, and they should all have their plans ready, so that at the end of the war they would be in a position to put their claims into operation. Their meeting that day had served a useful purpose by making it clear that they only wished for loans during the transition period. They would have to make that clear to the country. He had not made up his own mind, and had wanted to get all the information he could from them. He recognised the great indebtedness of the State to private enterprise in the past, and he should be sorry to see it ended. So would all of us who know that private enterprise is fully capable of speedily supplying the half-million houses that are wanted, if kept unshackled and given business-like financial help till the confidence of the ordinary capitalist, which Mr. Lloyd George destroyed, is restored.

A meeting will be held to-morrow at 5 p.m., at the Cannon Street Hotel, which it would be well for all readers who can spare the time to attend. It is convened by the Property Owners' Protection Society to consider the very drastic Bill now passing through Parliament to amend the Rent and Mortgage Interest (War Restrictions) Act. This Bill has gone from the Commons to the House of Lords. It gives the power to tenants to deduct from current rent due to the landlord, or recover in any other way, any rent paid since November 25, 1915, which is above the standard rent, viz., the rent the house was let for on August 3, 1914, whether to new or old tenants. Originally the Bill, as drawn, imposed on the landlord a penalty of £40 if he charged or received any rent above such standard rent, but through the representations made by the National Federation of Property Owners and the Property Owners' Protection Association, this was amended so as to make the penalty enforcible only if the landlord carried down the excess rent as arrears, after the tenant had requested him to delete them, but this is not sufficient, and a further amendment is needful, which will not make it obligatory upon the landlords to return any excess rent or the mortgagee any excess interest already paid, i.e., that the amending Bill shall not be retrospective. If landlords have to return all excess rents (most of them legally raised before the 1915 Act) and mortgagees the excess interest, since November 25, 1915, it will be a great hardship, and will lead to difficulties between mortgagees and mortgagors, owners and their tenants, and be most unfair where, as in thousands of cases, half of the excess rent received has been paid away by way of increased rates and taxes. The matter is one of great urgency and importance, and every property owner should support the association in order to avoid the great losses they will sustain.

Manchester is to be congratulated on the acquirement of the collection of pictures bequeathed to the city by the late Mr. James Blair, of Whalley Range, which was thrown open to the public in the Mosley Street Art Gallery last Wednesday, and will now be visited by students of English art, and particularly English water-colour art, from a much wider area than the city itself, the passage of some of its twenty-seven Turners from private into public ownership being in

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itself an event of national importance. We hope it will never occur to the city fathers of Manchester to sell off any of the Turners as our Trustees of the National Gallery wanted to! There is no telling, for really the civic representatives of Manchester badly deserve to be the guardians of such a gift. As it is, the Blair pictures are in the City Art Gallery, but light and space have only been found for them by bundling other treasures into the cellars. Meanwhile, not only is nothing done with the old infirmary site, but nothing is determined to be done, the last of several discouraging and distracting proposals being that a site which was acquired cheaply on the faith that it would serve some great monumental purpose shall be used as a gathering and dispersing ground for tramcars! The chief architectural need of Manchester, as the *Manchester Guardian* declares, is a structure which can be seen, invisibility either comparative or almost absolute being the sad condition of most of the fine buildings which the city has erected. But to this is added the further need of a worthy home for a collection of pictures which, if Mr. Blair's munificent example is much followed, will make Manchester a place of pilgrimage for art-lovers the world over.

Lord Faringdon, on behalf of the directors of the British Trade Corporation, denies emphatically that it has at any time been intended that that institution shall enter into business beyond the scope of what was contemplated in the report of the Departmental Committee which recommended the creation of the "British Trade Bank." The objection to its taking power to trade itself in certain circumstances is thus removed. Mr. P. Forrester, of the Union Bank of Manchester, whose suggestions were partly adopted by the Departmental Committee, favoured the establishment of a main company in London and a separate company in each large town. Mr. Forrester contemplated the main or local companies guaranteeing the completion of enterprises on which money had been advanced, and we hardly need say that it is important somebody should do that, or money might be literally thrown away. It is beyond doubt that important constructional works carried out by British contractors increase the demand for British manufactures, and thus increase the general prosperity of the country. We certainly think, however, that highly speculative undertakings in other countries should not be favoured to the ignoring of schemes equally sound which would develop the resources of the United Kingdom. It is many years since the Manchester Ship Canal was completed, but it remains our last great enterprise for the development of home resources, because we have never had a financial organisation equal to such works. It is not the last big thing that can be done, however, if we are sufficiently resolute. Good things abroad should, of course, be picked up as opportunity offers, but if we have any money for schemes which are less certain to be an immediate success we shall derive most advantage by giving the preference to those at home, and there is one huge need which towers menacingly above all others—house-building!

We have received from Mr. Richard Reid, the Agent-General of the Ontario Government, of 163, Strand, W.C., the March issue of the *Canadian Mining Journal*, which is devoted chiefly to a review of mining in Northen Ontario, special attention being given to gold and silver. Nickel and silver have, as most readers know, been plentifully found in Ontario for some years, but it is evident from recent discoveries that the province is likely at no distant date to rank among the world's greatest gold producers. Ontario's chief gold mines are in the Porcupine district, where important discoveries were made in 1909. Three large mines, the Hollinger, Dome, and McIntyre, have been developed in this district and will be large producers for many years. Several other properties have been developed, and a few of these are regular producers, though small in comparison with the big three. Kirkland Lake is Ontario's second gold district. One mine here, the Tough-Oakes, is a regular producer, and several properties are nearing the productive stage. Recent developments in the Kirkland Lake districts have been especially encouraging. Ontario's richest gold mine is the Crœsus, in Munro township. This property is a phenomenal one, the ore being exceedingly rich. The front cover illustrates the rich ore very temptingly. The Cobalt district is Ontario's chief silver producer. Important deposits have been worked at Gowganda, and during the past year a large body of high grade silver ore has been developed there. Most of Ontario's silver comes, however, from a small area near the town of Cobalt.

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION.

II.

By ROBERT THOMSON.

[With Illustrations.]

The efficient planning of a small dwelling, if not actually an exact science, is at least a very exacting one. It calls for the exercise of a degree of skill on the part of the planner which cannot be satisfied by results which in any respect fall short of those which are possible of attainment. In the past the waste of money entailed by the inefficient planning of such dwellings has been colossal, and the waste of health, and even of life itself, have been appalling. It is on the humbler classes that the main burden of this amazing inefficiency has fallen. It is the wage-earner who has not only had to suffer from the result of the defectively-planned dwelling, but it is he who has had to pay the whole of the excessive cost which such dwellings inevitably entail. The inefficient planner suffers not at all. Now, however, that the country and Parliament have awakened to the urgent necessity of grappling with the housing problem in a wholesale way, it would be a crime if the colossal amount of money, or even the smallest fraction of it, which is required to provide housing for the people, be expended on dwellings of the type such as those which the plans put forward by the departmental and advisory committees would provide.

While the Departmental Committee, in their report, sagely remark that "In the case of a local authority building cottages with the use of public credit, it is obviously of primary importance that the greatest economic value for the outlay should be secured," they, committee-like, give no indication whatever regarding such economic value, or of any means of arriving at it. Unfortunately for the people, because of the lack of a reliable system and standard of measurement by which to accurately gauge the relative values of different plans, it has never, hitherto, been possible to effectively expose how very seriously defective the planning of even the best of existing types of cottage dwellings actually is. This great need has, however, been at last met, and it is, therefore, not any longer necessary to accept the plans of such dwellings at their authors' valuation of them, since it is now possible to measure not only the economic value of every cottage dwelling which can be put forward as a solution of the housing problem, but it is equally easy to ascertain and accurately assess the degree of skill which has been expended in its planning.

Although no figure of economic value is stated by either of the committees for any of the model plans which they put forward with their reports, this value is easily arrived at from data which the plans themselves provide. The volume of the houseroom, i.e., the air-space in its habitable apartments and kitchen, which a dwelling provides, and the cost of this houseroom per cubic foot, are probably the two most important factors in determining its economic value relatively to that of any other dwelling.

As the newly-evolved, health-promoting class of dwelling offers at a lower cost a very much higher economic value than is possible of attainment with any dwelling of existing type, it is desirable that its superiority in this respect be established on an official basis; and in order to satisfactorily accomplish this an authoritative collection of plans, having their economic value officially vouched, is, of course, required.

Since the Advisory Committee, in their report, state that "There can be no doubt of the substantial economy of building cottages in groups of four," and claim that their plan No. 8, which is one of this four-in-a-group type, "provides one of the most convenient and economical of cottages," they themselves have thus already made choice of the design which must champion their cause.

By estimating the cost of the block of four dwellings of this economical plan at the pre-war rate of, say, sixpence per cubic foot of its gross bulk, and dividing the sum thus arrived at by the total air-space in the habitable apartments and kitchens of the four dwellings, the cost of the houseroom works out at 15.069 pence per cubic foot. Dealing similarly with their designs Nos. 5, 6, and 8a, the figures work out at 15.021, 15.042, and 15.006 pence respectively. These figures thus provide a well-authenticated, officially-based standard rate, which will be taken at the round figure of 15 pence per cubic foot throughout the present series of articles.

From the statements of cost which have been published regarding the cottage dwellings erected in mid-Lanark two years ago, the cost of houseroom, calculated on the basis hereinbefore set forth, works out at an average rate of 19.054 pence per cubic foot; that for the five-apartment semi-detached cottages being 19.22 pence: and, as already stated, the cost of the houseroom in the Government Well Hall houses, which were erected at about the

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same time, is nearer half-a-crown than fifteen pence. In case there may appear to the reader to be some difficulty in the way of comparing the economic value of single-flatted dwellings with that of two-flatted ones, it may be here explained that all such difficulties at once disappear by employing the three following factors: — (1) The houseroom of one dwelling in the group, or the average, if they vary in size; (2) The roofed area of each pair of dwellings; and (3) the amount of walling and partitioning in each block of four dwellings. In order to enable exact comparisons to be made between plans of cottages of existing types and the plans in the accompanying educational series, it is, of course, necessary that the plans to be compared be so drawn as to conform to a common standard in regard to thickness of walls and partitions, width of stairs, height of ceilings, pitch of roof, etc., etc. To this end the plans of the official models have been redrawn in conformity with this common standard; and, in order that the planning of existing types shall have every possible advantage in the comparisons, these have, in every instance, been taken as the basis plans, and the plans of the new class of dwelling have been made to conform thereto.

The Advisory Committee state that their plan No. 9 "is a variation of No. 8, adapted to a village or semi-urban situation, where a drainage system exists," and that their plan No. 6 "is a modification of No. 5, adapted to a site in a village or urban area where there is a drainage system and water is laid on, and where ready access from the road to the back doors of the centre houses is important."

The statement that the photograph on page fifty-two of their report shows a "group of four cottages similar to design No. 5, built at Earswick, York," should prove interesting in that it incidentally shows the value of the opinion of a well-meaning philanthropist who passes as an authority on housing.

The Departmental Committee's plan No. xxvii., which shows their parlour type of cottage, together with the Advisory Committee's plan No. 6 and plan No. 9 in their report, which is fathered by both Committees, may be taken as showing the greatest economic value which the Government's advisers have been able to give with the two-flatted type of dwelling for the materials which they employ.

Copies of these official model plans are given in standardised form on Sheet II., on which figure 12 shows plan No. 9, figure 14 plan No. 6, and figure 17 plan No. xxvii. of the Departmental Committee's report.

These are the only plans of their four-in-a-group type which are suited for a village or semi-urban situation, where a drainage system exists; and plan xxvii. is the only example of the parlour house of this type given by the committees.

Plans figures 12 and 17 are shown with passageways to bring them into line with the official plan shown in figure 14, and in all three the passageway is shown 4 ft. 1½ ins. wide. The object of fixing on this dimension is that it may harmonise with that of the "close," which in the Scottish tenement type of dwelling must be 4 ft. wide between the finished plaster surfaces. The tenement is included in the present series of articles.

A glance at figure 12 shows that there is not even the semblance of a cupboard in this "most convenient of cottages," and that two of the apartments in each dwelling are either mutilated or distorted. In the two centre houses the staircases must be lit and ventilated by small dormer windows high up in the roof. These windows, the Advisory Committee state, "are not so convenient as ordinary windows, or so likely to be opened." In the same two houses, the committees, ignoring ordinary commonsense by-laws, place the w.c. against an inner wall in a position which would involve many difficulties in regard to pipe and drainage connections.

The committee's plan No. 6, shown in Fig. 14, is remarkable in that every one of the twenty apartments forming the group is either mutilated or distorted, and the two centre houses have no entrance lobby, the stair rising directly out of the living-room. The arrangement of the w.c.s in the two centre houses not only contravenes local by-laws, but is such that it would probably be found impossible to make a satisfactory job of it. In any case, the amount of piping and the number of bends, joints, and angles would constitute a record for complexity and cost. This amazing arrangement of w.c. is shown in section on Fig. 14, which shows also the diminutive coal cellar and the lack of headroom on the stair. Possibly the committee have overlooked these points.

It must surely be with feelings of intense disgust that architects having a knowledge of planning contemplate such official designs as that put forward by the Departmental Committee, now shown in Fig. 17. In this model block of four dwellings there are actually six roofs employed where one ought to have sufficed, and yet, notwithstanding this multiplicity of roofs, the official experts have found it necessary to employ beams to carry the main walls over each of the four sculleries. The parlour in each of the four dwellings is merely a passageway, those in the two end houses forming the only means of intercommunication between the bedrooms and the living-room, and all of them serving the purpose of an entrance lobby. The chimney flues from the four coppers are examples amazing to contemplate, and a study of a return journey between any one of the three bedrooms and "Tipperary" will disclose a record in regard to the number of doors which have to be manipulated.

The committee state in reference to these dwellings:—"We have had the advantage of conferring with Mr. Brook Kitchen, architect to the Local Government Board, on matters of planning and construction"; but from a study of their plans I cannot imagine they can have taken advantage of Mr. Kitchen's advice.

The following statement by the Advisory Committee in regard to "planning" should prove interesting now, and infinitely more so later on:—"When the accommodation to be provided has been settled, it is clear that there is a definite limit to the degree of economy to be secured by the careful planning and arrangement of that accommodation. This limit is determined by the fact that the quantity of material necessary to provide a given amount of house-room cannot be reduced below a definite amount. Careful planning enables the minimum to be approached very closely." Had that statement stood by itself it would have been unexceptionable, but as it conveys—as it is evidently deliberately framed to convey—the impression that the committee themselves have so thoroughly exhausted the possibilities of planning that beyond that which their heterogeneous collection of plans give there remains nothing further to be gained in the way of economy it becomes amusing. Its whole tendency must have been to discourage research.

These official plans were found to be far too crude to serve as a basis of comparison in the exhaustive investigations about to be made, and this discovery made it necessary to devise the three elementary examples of the two-flatted type of dwelling shown on Sheet III. The group of elementary plans seen in Figs. 18, 19, and 20 of Sheet III. show some of the advantages which have been secured by avoiding the corresponding defects in the official model plans on Sheet II. Among these advantages are: (1) The separation of the kitchen from the living-room, with two doors between them; the provision of (2) a bathroom, (3) a useful entrance lobby, 3 ft. 9 ins. wide; (4) direct and independent access from the entrance lobby to the two apartments named; (5) a straight stair, 3 ft. wide; (6) direct light and ventilation to each of the staircases from a window on the outer wall; (7) light from staircase to entrance lobby; (8) a pantry; (9) napery store; (10) only one entrance doorway to each dwelling; (11) no thoroughfare in any apartment; (12) every apartment symmetrical. The figures appended to the respective plans on Sheets II. and III. should be studied in conjunction with the foregoing advantages. The monetary value given with each plan on Sheets II. and III. indicates the shortage in the value of houseroom which the particular plan provides as compared with that given by the plan of corresponding roofed area at one of the intermediate stages before the perfected dwelling is reached.

These three elementary plans, Figs. 18, 19, and 20, are in several respects remarkable. In the first place, the sizes of the apartments have been made to conform exactly to the official requirements and recommendations set forth in paragraphs 35 and 36 of the Advisory Committee's report, and in this respect they are probably unique, as even the committees themselves have failed to submit a single plan in which their own recommendations as to sizes of apartments have been accurately embodied.

Plan Fig. 18 shows the committee's "irreducible" minimum, Fig. 19 their "Desirable" standard, and Fig. 20 their "Parlour" type of cottage.

In the second place, they are so planned that, without requiring either alteration or modification, they could be built (1) as detached cottages, (2) in semi-detached pairs, (3) in groups of four (4) in sixes, and (5) in terraces.

In the third place, they show the amount of houseroom which, by exact adherence to official sizes of apartments, it is possible to provide, together with the conveniences shown, in two-flatted dwellings of the five types just named.

In the fourth place, they serve to mark the limits which, while adhering to the official sizes, are possible of attainment with the two-flatted type of dwelling.

In the fifth place, they will provide the best of eivdence when the defects of back lanes and through passageways come up for consideration

In the sixth place, they provide the reliable basis from which to proceed in the series of investigations which disclose the solution of the Great Problem of the Small Dwelling.

(To be continued.)

A short summer term of eight weeks for the afternoon language classes in French, Russian, Italian, Spanish, German, and "English for Foreigners," will commence at the School of Engraving, Bolt Court, Fleet Street, E.C., on Wednesday, May 30. The fee for each language is one shilling, and new students will now be admitted.

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PIECE WORK IN THE BUILDING TRADE.

The advantages of artisans being paid for their labour on a basis of piece work are rapidly being more widely understood, and the system is now followed with complete success in many trades and industries. It benefits the employer by preventing waste of time, and is equally advantageous to the employee as it acts as an incentive to him to "speed up" as far as is compatible with good work. The man, therefore, who possesses talent as a quick worker gains a distinct advantage. He is not kept back by the slower workman, and his abilities find a fair market value. The difficulty of opposition by the Unions on the plea of protecting the slower workman, can be overcome by paying the men in gangs of from six upward, the total work done by such gang being allocated equally, or in any other way they may decide.

As already stated, the system is largely used in most industries, and there seems no doubt that it could be adopted with equal success in the building trade. As far as painters' work is concerned, it may be urged that the nature of the operations frequently will render piece work impracticable, but a closer examination of the subject will show that this is a false view to take. In drawing up an estimate of work, whether new or old, the master painter necessarily reduces every item to a unit, and by doing this, he affords at once complete opportunity of arranging to pay for the labour on such units. Even the most intricate work, other than the purely artistic, such as hand-painted ornaments of an elaborate character, is reduced to so many superficial or lineal yards or feet, and a proportion of the charge can be divided between labour and material.

Everything will, naturally, depend upon the prices fixed for the piece work, and here we may confidently look for guidance to other industries in which the system has proved successful. Before an estimate is drawn up, it would be necessary for the master painter to consult, say, two or three of the men appointed by their fellow workmen for the purpose, and to agree on the price of labour for every unit in the bill of quantities. One may suppose that the tendency would naturally be for the workmen to demand excessive prices, and for the masters to endeavour to get the very lowest, and so the pessimist might anticipate that a deadlock would ensue and the scheme prove a failure. In actual practice, however, it is found that, with a little trouble, a fair arrangement can be arrived at, because it must be remembered—and this is the whole crux of the subject—that if the price is high, the tender will stand no chance of being accepted. If, as will sometimes inevitably happen, certain items are found to be a little lower than they might have been, both employer and employee will suffer a little on that particular job, and the experience will be useful to them on the next tender they put in.

The fact must be admitted that the most important objection which can be urged against the piece-work system is that it leads to scamping, unless the greatest care is taken to prevent it. The journeymen in their desire to increase their wages are likely to work so quickly that imperfect results ensue. But this objection is one which might be urged with equal force in connection with all industries in which the system is used. When the weak spot in a system is clearly foreseen it can be dealt with effectively. Probably the best plan so far as the building trade is concerned would be to make the foreman on each job the judge of the quality of the work, and to pay him a generous weekly wage for the increased responsibility involved.

It is generally admitted that a great upheaval will follow the Declaration of Peace, and we are convinced that the solution of the problems which will presently face the master painter and master builder will be found in the adoption of the piece-work system. It will require judicious handling in a spirit of "give and take"; it will bring the employer and employed closer together in their mutual interest; and it will, without doubt, eliminate to a very large extent waste of time and put the workman on his metal to produce the best that is in him.—*The Decorator.*

Building Intelligence.

NEWPORT, CO. MAYO.—A new church is now in course of erection here from the designs of Mr. R. M. Butler, F.R.I.B.A., architect, Dublin, the contractors being Messrs. John Sisk and Son, Cork. The materials are local red grit sandstone, with dressings of the same. The barge and parapet copings are of County Dublin granite. The checker pattern in aisle walls is formed with red local stone and cream-coloured Balla stone alternating. The carved capitals and bases, etc., of the entrance doorway, etc., are of red Dumfries stone, owing to the impossibility of carving the local stone. Internally the nave is finished with a barrel-vaulted fibrous plaster ceiling, the slabs left rough, and pointed, the moulded ribs, corbels, etc., of the roof being also in fibrous plaster. The aisles have roofs groined in fibrous plaster, left rough and pointed. The Communion rails, pulpit, and the chancel and altar steps are of grey Beaumont (Cork) marble, relieved with Connemara green and Cork red marble. The chancel gates are of solid bronze in a Celtic design, enriched with brass and silver, and set with crystals and coloured stones.

EXPERIMENTAL BUILDING SCIENCE.*

A good deal is talked about "Building Science," but very few people seem to know what they mean. Building, of course, like any other art, must be based on the scientific application of all knowledge to the solution of its own special problems. For the most part, as things are, the ordinary craftsman, and not seldom the architect, is left to the mercies of the disciples of rule of thumb, or the distracting solicitude of the faddists, who would cram him with all the "ologies." There is, indeed, no text-book which prudently confines itself to the judicious selection of such branches of science as are likely to be needed by the student of building, and the lack of such has doubtless hindered teachers and restricted the field of work possible in the building departments of the technical schools of the country.

This want Mr. Manson, himself a teacher of, and examiner in, building of good standing, has set himself to supply, and, we think successfully. His general plan is, at any rate, sound. First, of course, the student should get a grounding in all essential elementary science, and be familiar with the practical, experimental, and mathematical methods of investigation thereof. Next, he should obtain by experiment and actual handling intimate and reliable acquaintance with the nature and properties of building materials; and then he will, or should be, able to discuss and investigate some of the larger problems arising in connection with the production and use of building materials and the design and construction of buildings.

Much of the work dealt with in this volume is, of course, common to most text-books of elementary science, but the elimination of matter not absolutely germane to building will certainly ease the work of the student and teacher, while the experimental treatment of many simple building problems will kindle and retain the student's interest. The details of construction are not dealt with. They are wisely left for another and a companion volume in this series, which, if as judiciously planned as this, will undoubtedly prove a most useful and needful link between the science and the art of building.

Nevill Hall, Monmouthshire, the residence of the late Lord Abergavenny, has been acquired by the county council for use as an asylum.

The Corporation of Dublin are inviting tenders for the erection of houses for the labouring classes on the Spitalfields area. The Treasury have agreed to the immediate release of £75,000 to start the work, and it is hoped operations will soon be in full swing. "More injustice to Ireland!" The British workingman must not be bothered with new houses till the war is over!

* "Experimental Building Science." Vol. I. By J. Leask Manson, B.Sc., Eng., etc. (Cambridge University Press. 6s.)

Our Illustrations.

UPTON GREY MANOR, WINCHFIELD, HANTS.

This was an old house erected in Tudor times, but, having been occupied as a farm-house for a long while and then divided into a pair of labourers' cottages, very little of the original work remained outside; practically the only parts of Tudor date consisted of a half-timbered gable at the north end and two chimney stacks. The original oak staircase had, however, been well preserved, considering the rough usage to which the premises had been subjected, and two rooms retained the old wainscotting. This panelling to the bedrooms has been adapted to the hall, and everything that could be retained was made use of and restored. The porch and garden bay (of which last feature we gave a drawing by Mr. F. L. Griggs from the Royal Academy, December 10, 1909) were carried out in old oak timbering. Mr. Ernest Newton, A.R.A., P.R.I.B.A., was the architect, assisted by Mr. W. Nichols, as the architect in residence, to insure the conservation of the historic character of the place during these alterations and repairs. Mr. Mauser, of Sherfield-on-Lodden, near Basingstoke, was the builder. The two photographs reproduced to-day are now on view at the Royal Academy Exhibition.

PRUDENTIAL BUILDINGS, LEICESTER.

The new offices of the Prudential Assurance Company in Leicester occupy a site with two frontages—one in Hoke Street and the other in Grey Friars. It is the former, and more important façade which is here illustrated. Most of the extensive ground floor is occupied by the company, whose large public office is entered from the central doorway. The basement, the ground-floor rooms facing Grey Friars, and the upper stories are let to various tenants. The photograph here illustrated is now at the Royal Academy. Messrs. W. Corah and Son, of Loughborough, were the general contractors. The architect, Mr. Paul Waterhouse, M.A., has treated the Grey Friars elevation in a simple classic motive, using red brick facings among the stone dressings. The building supersedes the smaller office in Gallowtree Gate designed by his late father, Mr. Alfred Waterhouse, R.A.

ST. WILFRID'S CHURCH, HARROGATE—THE CHOIR.

This very fine cruciform church, designed by Mr. Temple Moore, F.R.I.B.A., of Hampstead, is represented by four photographs in this season's exhibition of the Royal Academy. We illustrate one of these, and have chosen that of the choir. The other pictures of the building will follow shortly. An exterior perspective of the church from the S.W. appeared in our issue of May 20, 1910, the original drawing being shown at the Academy that year. The nave was then in hand, and the building work has been more or less going on ever since. The eminence of the site in Duchy Road adds much to the imposing effect of the group. The accommodation provides for over a thousand worshippers. The stately proportions and simple massive character of the work give the church much distinction. The plan consists of a big nave and transepts with a low square belfry tower over the crossing, and a choir of three bays. A Lady chapel of lower elevation extends beyond the eastern wall of the church. The vestries are on the south side of the chancel. The organ is in the north transept. The contracts have been carried forward in serial form, as the work had to be done in sections, and so gradually completing the undertaking.

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION.

These typical examples of cottage planning will be found described in Mr. Robert Thomson's second article on p. 454. The series will be continued next week, and till concluded.

The Aberdare U.D.C. have adopted a housing scheme for Abernant estimated to cost £5,000.

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SHEET II

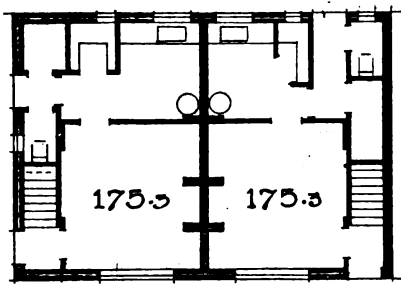
EDUCATIONAL SERIES.

RUDIMENTARY EXAMPLES.

FIRST STAGE.

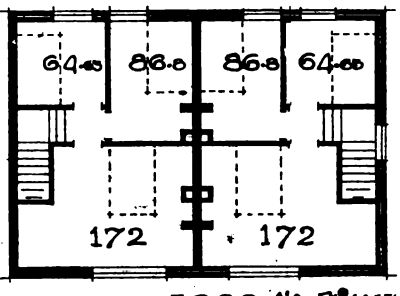
927

FIG. 12



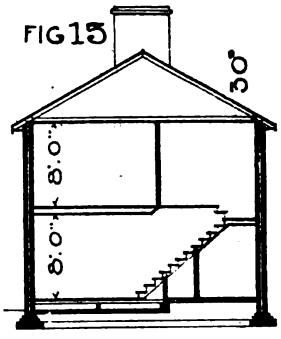
4066
927 4·386
£209·16·0

FIG. 12A



3989 NO PASSAGEWAY
867 4·600

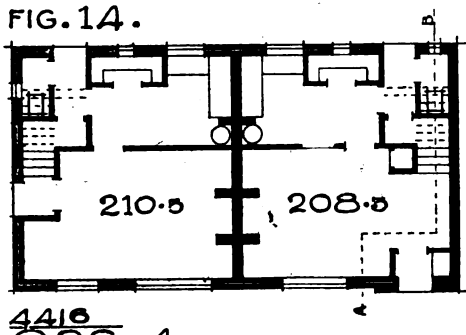
FIG 13



SECTION A.B. FIG. 14

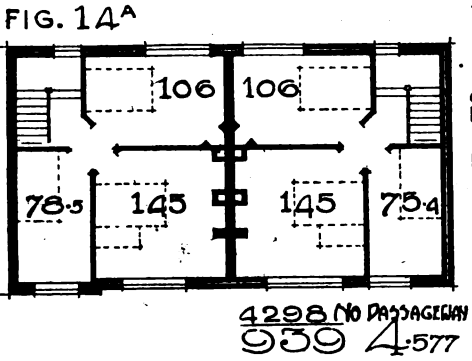
986

FIG. 14.

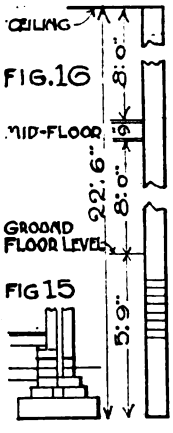


4416
986 4·478
£222·16·0

FIG. 14A



4298 NO PASSAGEWAY
939 4·577



1235

FIG. 17.

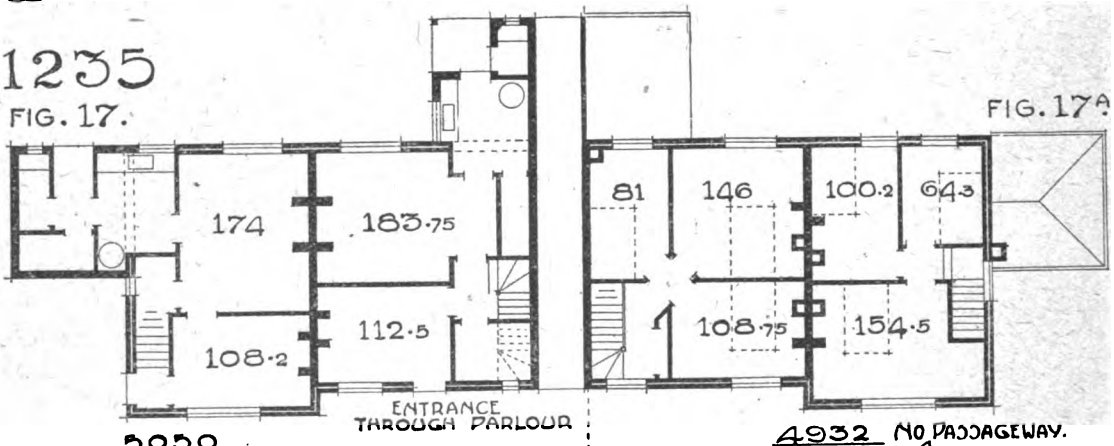
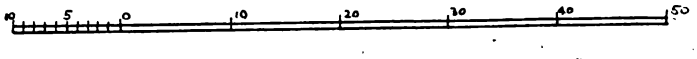


FIG. 17A

5050
1235 4·089
£327·16·0

4932 NO PASSAGEWAY.
1169 4·218



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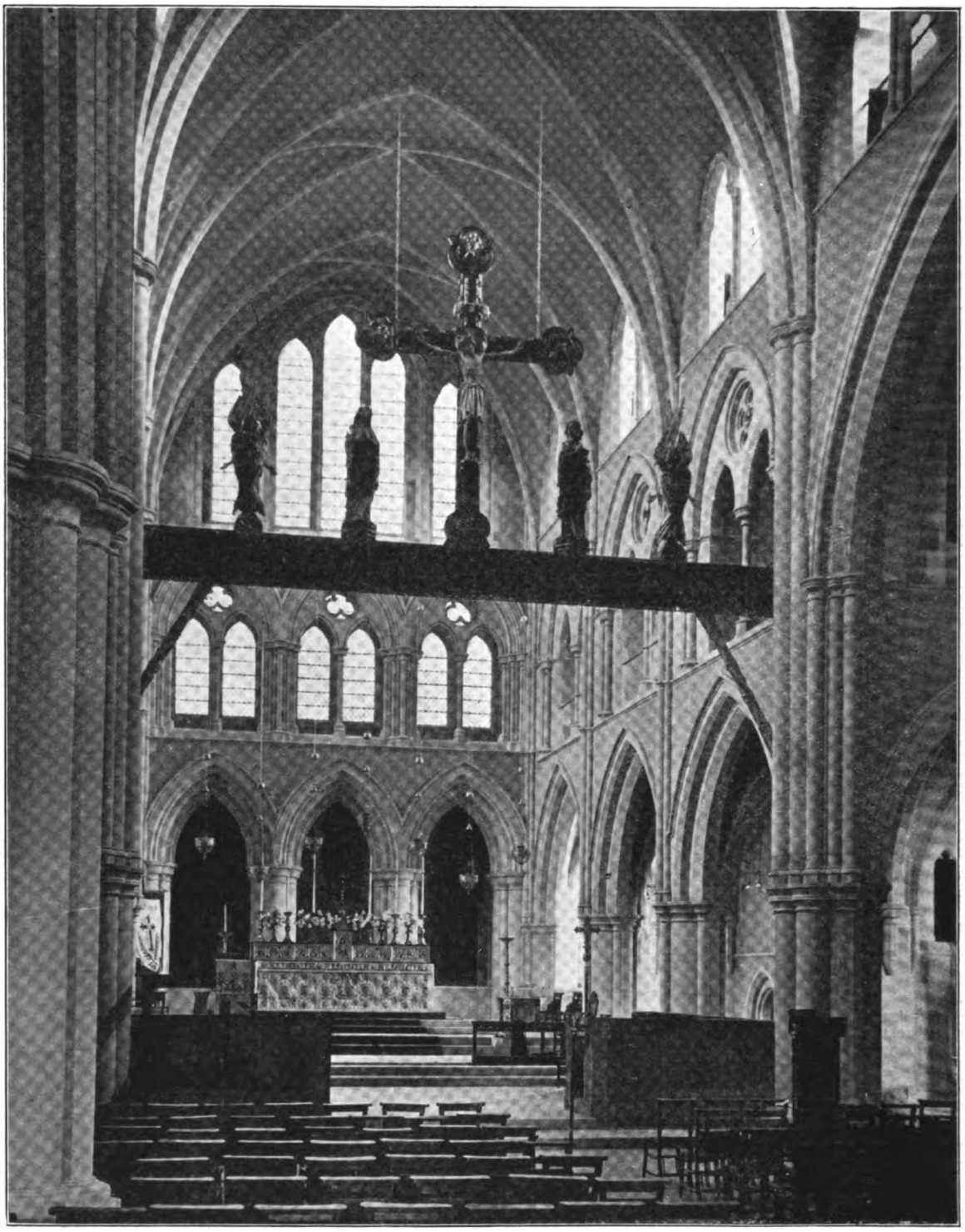

T. J. Hanstock, Photo.]

ST. WILFRID'S CHURCH, HARROGATE: THE CHOIR.

Mr. TEMPLE MOORE, F.R.I.B.A., Architect.

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Thos Lewis, Ltd., Photo.]

UPTON GREY MANOR, WINCHFIELD, HAMPSHIRE.—Mr. Ernest Newton, A.R.A., P.R.I.B.A., Architect.

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Thos. Lewis, Ltd., Photo.]

THE PORCH, UPTON GREY MANOR, WINCHFIELD, HANTS.

Mr. Ernest Newton, A.R.A., P.R.I.B.A., Architect.

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PRUDENTIAL BUILDINGS, LEICESTER.
Mr. PAUL WATERHOUSE, M.A., F.R.I.B.A., Architect.

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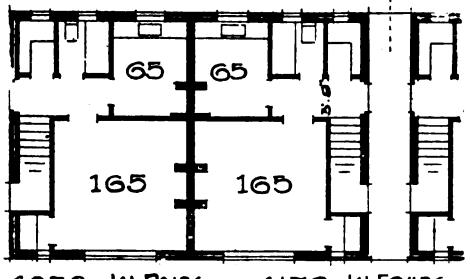
SHEET III. EDUCATIONAL SERIES. SECOND STAGE

ELEMENTARY EXAMPLES.

894

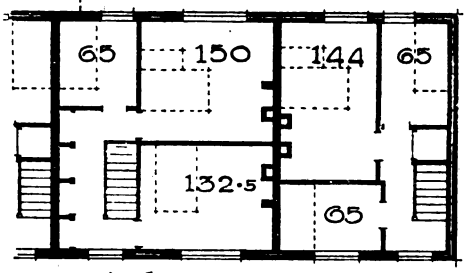
FIG 18



4032 IN PAIRS 848 4·754 £162 · 12 · 0

4179 IN FOURS 894 4·677 £184 · 0 · 0

FIG 18A

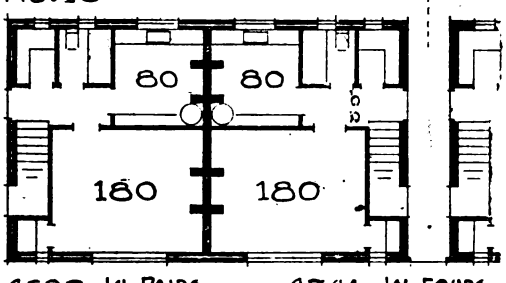


4228 IN SIXES 906 4·666 £185 · 2 · 0

4326 IN TERRACES 939 4·607 £201 · 5 · 0

972

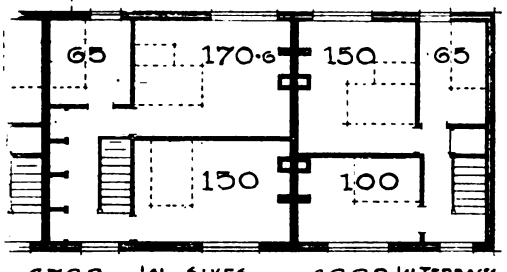
FIG. 19



4600 IN PAIRS 928 4·955 £176 · 8 · 0

4741 IN FOURS 972 4·877 £194 · 6 · 0

FIG. 19

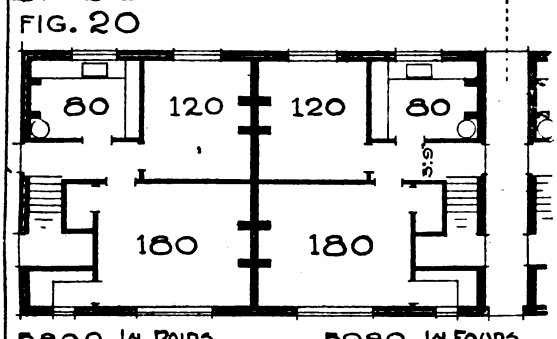


4788 IN SIXES 988 4·846 £199 · 11 · 0

4882 IN TERRACES 1017 4·801 £213 · 5 · 0

1218

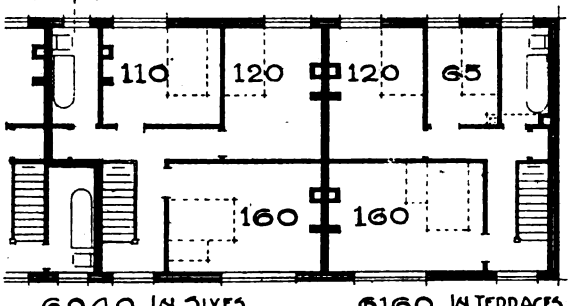
FIG. 20



5800 IN PAIRS 1169 4·961 £241 · 18 · 0

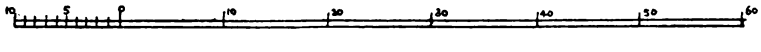
5980 IN FOURS 1218 4·917 £259 · 10 · 0

FIG. 20A



6040 IN SIXES 1235 4·890 £265 · 18 · 0

6160 IN TERRACES 1267 4·861 £283 · 7 · 0



TION: TYPICAL EXAMPLES.—By Mr. ROBERT THOMSON, Architect.

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A PLEA FOR MURAL PAINTING.*

By J. M. ORR, F.I.B.D.

There have admittedly been in the past periods in which the lamp of the Arts has burned brightly, when men have loved what was fair, and found pleasure in the exercise of their finest instincts. What has come down to us from those days, and what may we learn from them? Did the giants of earlier times or their teachers or successors discard as unworthy the charm of colour, or the interest and ingenuity and delicate skill of ornament? Were they timorous or tentative when opportunity offered for the exercise of their powers? Their work was not all good. They made sad blunders at times; but they were not discouraged thereby, and learned like wise men from their failures. Which do we admire to-day in S. Croce, the work of Giotto or the work of the men whose whitewash blotted out his frescoes for centuries? Whitewash is quite a useful material, but surely the higher reaches of imagination can hardly find scope in glorified whitewashing or schemes of neutral tones?

If we go back to the records of the civilisations of past ages, whether Egyptian, Etruscan, Indian, Persian or Chinese, we find pattern used in profusion and colour applied with skill and understanding.

When we come to the period in which what may still be regarded as the finest standard was attained—the Grecian period—we find ornament employed with the rarest discernment and skill. Many of the ornaments were from Assyrian sources, but they were used with new appreciation, and, what is more remarkable, colour was applied in addition. We have always thought of the spotless purity of the statutory marble of the Greek edifices, but later and more exhaustive research has discovered traces of colour and gilding even on those peerless marvels of the sculptor's art which seem to stand in need of no such adornment.

Recent years have served to reveal the place which mural painting occupied in the homes and palaces of Imperial Rome. Within the last fifteen years excavations have laid bare the house of Livia, in which frescoes executed by Greek painters show that what has been known for centuries as Pompeian decoration was really the style in vogue in Rome and elsewhere in Italy during the Roman Empire. As might be expected in an Imperial City, the prevailing note is splendour of colour, rich to gorgeousness.

When the incursions of the Goths and Vandals became too frequent to be comfortable for the now less war-like Romans, the seat of Government was moved to Constantinople and the Byzantine Empire was founded; but we find that the Roman colour tradition was maintained. At this time, however, mosaic was the medium employed. Its permanence has been of value in preserving for us, to this day, as in Ravenna, the work of the fifth and sixth centuries. Perhaps some day when Constantinople is under a more enlightened rule, S. Sophia may yield up buried treasure of inestimable value. S. Apollinare in Ravenna with its wonderful procession of martyrs, and S. Vitale with its contemporary portraits of the Emperor Theodoric and Theodora, will entitle Ravenna to be called "the Pompeii of the fifth and sixth centuries." These churches served as models for most of the Bascilican churches in Italy; and we find mosaics of very similar style in "S. Clementi" and "S. Paul's without the walls" at Rome, and in parts of "S. Marco" at Venice—where the entire cupolas, roof and walls were covered with mosaics.

The work which seems to develop most naturally from this mosaic decorative treatment is that of the Sienese School. The sumptuous colouring of the paintings of this School, with their gilded backgrounds and gorgeous reds and blues and greens appears to be a rendering in paint of the glories of mosaic. The more flexible medium renders possible a less archaic treatment, and leads towards the freedom and grace and infinite variety of the Florentine work.

Contemporarily with the earlier Sienese work, we find the Moors in Spain busy with the construction and decoration of the Alhambra, where pattern akin to the earlier Indian and Persian work is employed with the utmost skill and refinement. Even to-day, after the weathering of seven centuries, something can be seen of the extraordinary richness and beauty of the colouring. When we come to the Italy of the thirteenth, fourteenth and fifteenth centuries, we are at a loss how to proceed. From the day when Cimabue's "Madonna" was carried in triumphal procession through the streets of Florence to S. Maria Novella, down through the better part of three centuries, to the culmination in Michael Angelo, Raphael and Leonardo, the Florentine School produced an incomparable succession of artists great in everything pertaining to their art, and whose works remain, a priceless heritage.

Cimabue's work, while "softening the outlines, improving the flesh tints, and giving projection and a sense of rotundity to his forms "made little progress from the stiff conventionalism of the Byzantine tradition which had regulated decorative work, practically up to his day.

It remained for his pupil Giotto finally to break the fetters which had bound the art of painting, and his work marks a new epoch. His earliest frescoes—said to have been in the Badia at Florence—have perished; but his wonderful series in the aisle of the Upper Church of St. Francis at Assisi still remains; while in the Lower Church there, the ceiling is decorated with noble allegorical paintings which mark its growing power. In the Bargello at Florence, during the 19th century, some work of his was disentombed from the whitewash of centuries; but it has been badly marred by restoration. His next great series is that of the frescoes in the Arena Chapel at Padua. As has been well written of these—"Here he rises to his highest power, realising the scenes of sacred history and legend with a directness and intensity, such as had not hitherto appeared in Italian art." It is said that Dante, a great personal friend, aided him by suggestions in his treatment of the symbolical subjects there.

But the culmination of his art was reached in the city with which he was most closely associated, and of which he was in his later years "Master of Works"—the city of Florence. The frescoes in the Peruzzi Chapel of Santa Croce there are masterpieces which "clear contemporary admirers from the charge of exaggerated admiration and unwarranted flattery," and justify all that was said respecting the grandeur of his style. These, and the frescoes in the Bardi Chapel, have been uncovered, but it is known that other work of Giotto's exists in other chapels of Santa Croce, and may one day be revealed.

We may no more than mention other famous Florentines of the fourteenth century, Orcagna, the Gaddis and Masolino, whose work is found both in their native town and in other Italian cities.

The fifteenth century found Florence equally rich in painters of surpassing skill and achievement. Fra Angelico, who is said to have been the one painter capable of realising the state of the blessed, Masaccio, Benozzi Gozzoli, Botticelli, Filippino Lippi, and Ghirlandajo. We are lost in wonder that such wealth of endowment should have been lavished on one little Tuscan city, when any one of its artists would have brought glory to any other city in the world.

A giant figure among men of the sixteenth century, also a Florentine, Michael Angelo, achieved distinction as a painter by one piece of work forced upon him—"against his own judgment," it is said—by Pope Julius II. Although his whole previous training had been in sculpture work, his patron insisted that he, and not Raphael, should decorate the ceiling of his Sistine Chapel. This occupied nearly four years, during which time no one but an old man who had cooked his food was allowed within the building. All the more extraordinary, therefore, is the display exhibited of accurate knowledge of the human form in every variety of pose and every phase of action. Closer analysis of the various compartments of the ceiling and of the spandrels and lunettes only reveals more clearly "the super-human invention, the miraculous variety of attitude and gesture which place this marvellous work among the greatest achievements of human energy." Thirty years after, when sixty-two years of age, he painted on the eastern wall of the chapel his "Last Judgment."

We hardly think of Leonardo da Vinci as a Florentine, his work was so little associated with his native town; only, indeed, as an architect and engineer in the service of Cæsar Borgia; but he was born at Vinci, a village in the Val D'Arno between Pisa and Florence. His one achievement in mural decoration which is still in evidence is that on which his fame rests, and rests securely, his "Last Supper," painted on the wall of the refectory of the Convent of Santa Maria Della Grazie, in Milan. Faded and dilapidated as it is now, after the ruinous effect of damp plaster on oil paint, and the weathering of over 300 years, it remains monumental in its noble dignity, one of the masterpieces of the world.

It was not, however, Florence alone which bred great artists. Umbria can boast a notable trio in an ascending scale of excellence, in Perugino, Pinturicchio, and Raphael. Perugino or Peter of Perugia, though never attaining the heights to which the others rose, had the distinction of having had them both as pupils and assistants. He was employed in the decoration of the Sistine Chapel, and some of his work still remains. Other panels there were afterwards painted over, some by Michael Angelo, to make way for his "Last Judgment." His work in the Papal Chambers at the Vatican

DECORATION BY EDWIN A. ABBEY OF DISPATCH ROOM IN BOSTON PUBLIC LIBRARY, U.S.A.

* From a paper read at Painters' Hall, before the Incorporated Institute of British Decorators. For the illustrations we are indebted to *The Decorator*.

had a somewhat happier fate. His paintings in the "Stanza del Incendio" were the only frescoes spared when Raphael was commissioned to substitute his works for those formerly painted on the ceilings and walls.

Pinturicchio acted as assistant to Perugino when engaged on the decoration of the Sistine Chapel, and after that spent nearly eight years in painting frescoes on the walls of the Chapels of Santa Maria del Popolo in Rome. After some work in Orvieto he painted six frescoes on the walls of what is now the Vatican Library. Other work he did in Spello and Siena, but his most notable achievement was his decoration of the Piccolomini Library of Siena Cathedral. This forms one of the most complete and homogeneous schemes of decoration in existence. Ceiling, spandrels, and walls are treated with infinite richness and elaboration, yet with masterly co-ordination and restraint. The wall panels represent the most conspicuous incidents in the career of the native of Siena who became Pope Pius II. The ceiling panels have mythological subjects; and the dividing bands there, and the pilasters on the walls, are enriched with arabesques of great delicacy. Advantage has, of course, been gained here by the fact that the entire scheme was designed and executed by or under the direction of one man—a most unusual circumstance in days of capricious patrons!

The last of the Umbrian Trio, the greatest of them, and one of the most perfect artists of all time, Raphael, in his short life of thirty-seven years maintained a level in his work which other men could only reach in moments of inspiration. He has been called "the man who succeeded in displaying with a single effort the progress made by Italian painters from the days of Giotto to those of Ghirlandajo." Again, it has been said of him, "Raphael admirably transformed the antique into something living and present to the moderns, infusing in groups and figures the life of a scenic actuality." He combined the brightness and sweetness of the Umbrian with the breadth of execution of the Florintine. His conclusion as to the relative merits of Leonardo and Michael Angelo was that Leonardo was the better man so far as grace and expression was concerned; though for action the spirit of Michael Angelo might be preferable. In his own work there is a combination of the two qualities. His easel pictures, exquisite to the last degree, do not concern us in our present study; but his other work is of supreme importance to us. His discovery of the ancient Roman decoration to which reference has already been made led to the decoration of the Loggiae in the Vatican; where the treatment of what, for want of a better name, has been termed Arabesque ornament, has a delicate beauty and fertile fancy never equalled. This, however, was relaxation to him! His work is best shown in his great decorations in the Stanze in the Vatican, in his cartoons now in South Kensington, and in the tapestries made from these for the Sistine Chapel, which are all "masterpieces worthy of a pilgrimage." To say more would really be to say less! Adequate verbal description of such work is beyond the range of the present writer. In Perugia are many fine examples of the work of these masters, and scattered through many towns of little importance there are others.

The strange perversity of taste that makes the charming town of Pisa remarkable above all for its leaning tower only illustrates the fact that the abnormal makes more impression than more worthy things of a normal kind. The Campanile is by far the least interesting of the striking and unique group of buildings of which it forms a part with the cathedral, the baptistry, and the Campo Santa, to say nothing of the noble crescent formed by the buildings following the stately sweep of the Arno through the picturesque old city. In the Campo Santa there is a great series of frescoes round the walls. Some were believed to have been the work of Orcagna, the early fourteenth-century Florentine, but these are now thought to be the work of Sienese painters. Twenty-four of them, however, are from the hand of another Florentine, Benozzo Gozzoli, who worked fully a century later. His work shows a great individuality of treatment, true landscape feeling, and something of naturalistic tendency. He did some fine work in the Palazzo Riccardi in Florence; but we are surprised and delighted to find the work of such a master in the decoration of the cathedral of a little out-of-the-way hill-town like San Gimignano. Painters of these days were prodigal of their efforts.

Parma is another of the cities, unimportant nowadays, in which are notable pieces of decorative painting. The large dome of the cathedral contains Correggio's great work "The Assumption of the Virgin," done after he had executed in Padua a fine series of frescoes in the Convent San Pavlo and a dome in San Giavonni there. The Octagonal Baptistry in Parma is decorated throughout its entire interior with Scriptural subjects; while in the Church of St. John Evangelist there is another dome of Correggio's and in the monastery a ceiling by him. Mantua has a multitude of frescoes by Giulio Romano, the pupil and assistant of Raphael, who inherited much of his master's power and imagination, but lacked his grace and poetical refinement.

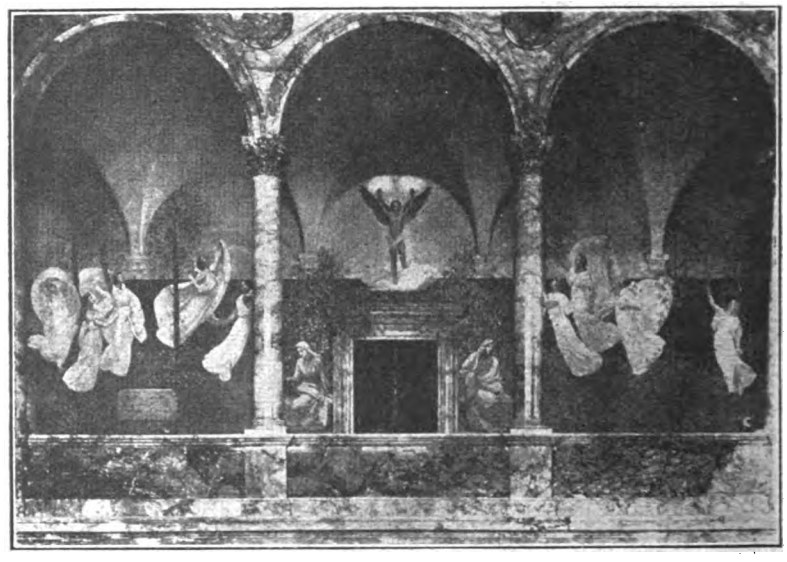
Away in the North, in Lombardy, and in delightful Lugano, is a remarkable specimen of the work of one not very well known, but classed by Ruskin as one of the "five supreme painters," Bernardino Luini. He was in Milan when Leonardo da Vinci was in the zenith of his power, and exercising a mighty influence in the academy there. Luini adopted and turned to his own uses many of the characteristics of Leonardo. It is surely a double-edged compliment that many of his works used to be attributed to Leonardo. His "Crucifixion" at Lugano is altogether wonderful work.

Italy is so absorbing in its relation to the art of mural painting that we have to dismiss even Venice with a single reference. Tintoretto, another of Ruskin's "five supreme painters," did some work in fresco, notably "Belshazzar's Feast," for the arsenal, but his greatest and certainly his largest works were done on canvas, and do not come strictly within our scope.

For France little space is left. Much decorative painting adorned the palaces of the Bourbons and of the nobles of monarchical days; but it calls for little reference, as it is more interesting historically than artistically. In recent times, however, the mantle of the great masters has fallen on a native of France; and nothing finer, since the golden days of which we have been speaking, has been accomplished in mural painting than the work of Puvis de Chavannes.

In Germany the outstanding work is the Rathhaus of Gostar decorated by Albert Durer and his pupils.

In England, as has been found within re cent years, the Normans were in the habit of decorating in colour the ecclesiastical buildings, which to-day would be thought to be desecrated by the introduction of painting. In St. Albans the tempera paintings uncovered from their coats of whitewash are most interesting. The "Stations of the Cross," painted on the main piers of the nave, are strongly reminiscent of the frescoes of early Christian days in Rome. The decora-



DECORATION BY PUVIS DE CHAVANNES OF LANDING OF STAIRCASE IN BOSTON PUBLIC LIBRARY, U.S.A.
"MASSES WELCOMING THE GENIUS OF ENLIGHTENMENT."

CANTERBURY CATHEDRAL: PAINTING IN APSE IN CRYPT, ST. GABRIEL'S CHAPEL.
(FROM GREEN'S "ILLUSTRATED HISTORY.")

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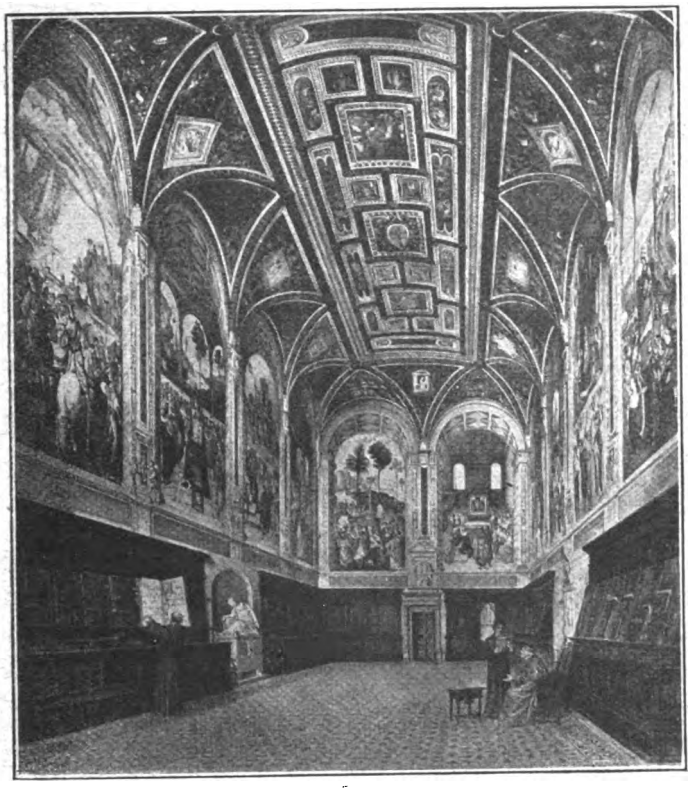
tions of the roofs of the choir there are also worthy of study. Winchester, Canterbury, with its St. Gabriel's Chapel, Norwich, Salisbury and other of the English cathedrals, as well as churches like Easby and Pickering, show that colour and decorations were regarded in the middle ages as necessary adjuncts of any dignified building. The Church of the Holy Cross at Winchester was last century redecorated in part in a scheme based on Norman precedent. Unhappily, the medium employed—oil paint—was unsuitable, and the result dull and heavy as compared with the effects of the tempera used by the early decorators. Need we mention the fine decorative painting done in modern days by painters like George Frederick Watts, Alfred Stevens, Sir William B. Richmond and others in St. Paul's, the Royal Exchange, and elsewhere in London?

In Scotland there are here and there relics of old decorative painting, such as at Culross, but plaster work seemed to present more attractions to the dwellers in the frowning old castles of "Caledonia stern and wild." A fine plaster roof and tapestried walls seems to have been the Scottish ideal.

America has been setting a noble example in its application of applied art. To mention only one example—Boston, in its Public Library, had a building worthy of decoration, and the city council had the mind to spend lavishly in the execution of the decorative scheme. Puvis de Chavannes was brought from Paris, and carried through a great scheme of decoration in the main staircase. Mr. Sargent and the lamented Edwin A. Abbey were commissioned to decorate the main apartments; and above wood panelling is a series of magnificent friezes, great both in design and colour. May other public bodies on both sides of the Atlantic follow the lead thus given!



DECORATION BY PINTURICCHIO OF THE PICCOLOMINI LIBRARY AT SIENA.

Mr. Charles Winn, of the Uplands, Selly Hill, Birmingham, manufacturer, whose death took place on March 1, left estate valued at £35,002. He left a portrait of the late John Pettie, R.A., to his son Philip, his library to his son Ernest, £500 and consumable stores to his wife, and £200 per annum to his daughter Edith during spinsterhood. The residue of his property he left in trust for his wife for life, with remainder in trust for his children.

LEGAL INTELLIGENCE.

"NEW BUILDINGS" AND ESCAPE FROM FIRE.—On the 21st inst. the London County Council appeared by counsel, before the Lord Chief Justice and Justices Avory and Shearman, to show cause against a rule of mandamus granted, directed to the Council to furnish the district surveyor of Bermondsey with particulars of escape from fire from a building at Bermondsey required by the Council to be provided in accordance with the plans approved by the L.C.C. on the ground that the new building mentioned was within the provision of Section 7 of the London Building Acts Amendment Act, 1905. The point raised in the case turned upon the construction of that Act and the Factory and Workshop Act, 1901. Counsel contended that the sections in question in the Act, those which dealt with new buildings, did not apply here. The District Surveyor of Bermondsey complained that he had not been furnished with details of means of escape from the building as required by the Council or in accordance with the plans submitted to the Council. Counsel's submission was that this was not a new building. He read an affidavit of Mr. W. E. Riley, F.R.I.B.A., superintending architect, London County Council, stating that the Council had not dealt with the building under the Act, and that Section 7 did not apply to it. The L.C.C., said counsel, looked upon the building as an extension of an existing factory, and, therefore, not a new building within Section 7. The substantial point was that the L.C.C. said this was a factory, the plans dealt with it as a factory, and the L.C.C. dealt with it as a factory under the Factory Act.—The Lord Chief Justice said the first question was whether this was a new building. A new building was defined by the Act as a building "independent and separate," notwithstanding that it was connected with the old building. In this case the building was connected with the old building in more senses than one, and was exactly similar to a person building an extension of his house. It was, in his opinion, an extension of the old building, and an "increase" which did not come within the definition of a new building, and was not a new building under the Act of 1905. It was a factory extension. The rule would, therefore, be discharged. The other judges agreed.

All brass and copper door-handles and door-plates in every Austrian town containing over 2,000 inhabitants will be requisitioned next month. The authorities expect to obtain 9,000 tons of metal by this means.

Correspondence.

BALUSTRADES AS SKYLINES—SIR ASTON WEBB AND SIR CHRISTOPHER WREN.

To the Editor of the BUILDING NEWS.

Sir,—In your review of the Architectural Gallery at the Royal Academy given on May 9, I noticed a remark about the attic of Sir Aston Webb's work just carried out at 35, Porchester Terrace, W., which appeared to me rather timely, inasmuch as the reviewer said that "the absence of a balustrade to the main walls spares it from the commonplace of that peculiar type of suburban domestic work so familiar in the older parts of London, built when cement-rendering came into vogue."

On the occasion of my visit I happened to hear a well-known architectural authority express a regret that Sir Aston Webb had not masked the attic of his building with a balustrade. No doubt people will differ, and I do not propose to discuss the point, but may perhaps support my view of the correct judgment of Sir Aston Webb by quoting Sir Christopher Wren, although, of course, no two buildings could be possibly more unlike than St. Paul's Cathedral and this villa in cement just lately re-constructed and enlarged in Porchester Terrace, Bayswater.

The memorial from which I quote has not, I believe, been printed before, and it is preserved among the papers of Archbishop Wake at Christ Church, Oxford, the extracts on which I rely being printed last year by permission of the trustees of the MSS. in Mr. Aldred W. Rowden's "The Primates of the Four Georges."

Wake had a good deal to do with the finishing of St. Paul's, and when the work was nearing completion the Commissioners passed a resolution to the effect that a "Balustrade of stone be set up on the Top of the Church," unless Wren certified within a fortnight that it was contrary to the principles of architecture. Wren in reply said: "I never designed a Balustrade. Persons of little skill in architecture did expect, I believe, to see something they had been used to in Gothic structures, and ladys think nothing well without an edging. A Balustrade is suppos'd a sort of plinth above the upper Colonade. . . . In the inward angles, where the Pilasters cannot be doubled as before they were, the two voids, or open spaces, would meet in the angle with one small Pilaster between and create a very disagreeable mixture. . . . There is already over the Entablature a proper Plinth which regularly terminates the whole building, and as no provision was originally made in my plan for a Balustrade the setting up of one in such a confus'd manner over the Plinth must apparently break with the Harmony of the whole machine, and in this case be contrary to the Principles of Architecture. . . . My opinion therefore is to have statues erected on the four Pediments only, which will be a most proper Noble and sufficient ornament to the whole Fabric, and was never omitted in the best Antient Greek and Roman Architecture. . . . If I glory it is in the singular mercy of God who has enabled me to begin and finish my great work so conformable to the antient model."

I am, etc.,

AN OLD TEE SQUARE.

Whitsun, 1917.

Mr. Cecil G. Argles has been appointed agent on the Blenheim estates of the Duke of Marlborough, and will be succeeded at Arundel, where he recently followed the late Colonel E. J. Mostyn, by Mr. Percy Tyrwhitt, of Hooton Roberts, Rotherham, Yorkshire.

The relative cost and serviceability of concrete and brick for sewers has been reported upon by the staff of the Chicago Council Committee on Finance. The report showed no material advantage or disadvantage for concrete as compared with brick, except that the cost for the former probably would be somewhat less. The council committee, however, recommended the use of brick, which is the general practice in Chicago.

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Our Office Table.

The increased importance given to the Channel Tunnel by Sir Francis Fox's recent paper before the Royal Geographical Society has drawn attention to other means of joining up England and France. Some of these were very fantastic. So long ago as 1802 a French mining engineer named Mathieu proposed to Napoleon the construction of a tunnel under the Straits of Dover, to be ventilated by iron shafts rising at intervals above the sea. Thirty-six years later Thomé de Gamond, another Frenchman, suggested an isthmus of masonry across the Straits, with three large openings for ships, the spaces to be crossed by floating bridges or submarine passages. There are others—but from the whole the tunnel scheme emerges triumphant.

At the meeting at Bangor last week of the newly-formed branch of the Welsh Housing and Development Association, Mr. Charles T. Ruthen, M.S.A., the treasurer, spoke of the work of the South Wales Garden City and Town-planning Association, and said they in South Wales looked upon the work of their association quite optimistically, and felt they had had a considerable amount of payment already, and looked for further payment in the future. As to house-planning, there were a number of ladies who thought that, while there were many good men architects, there were also some bad men architects. Those ladies thought good houses would never be planned until the matter was taken in hand by the ladies themselves, and the South Wales Association had thought it would be a good thing to collect a large body of opinion of many thousands of women on the faults of the plans prepared by men architects. As an architect himself, he saw no reason—women living in houses more than men did—why women should not be allowed to control the planning of houses in which they had to live.

We have received from the High Commissioner for Australia an interesting and useful report relating to the design and construction of the dams for the proposed ornamental waters at the new Federal capital Canberra. When the selection of Canberra as the site for the future capital was under consideration, one of the advantages claimed for it was that the river Molonglo flowing through the area in a westerly direction afforded facilities for the conservation of water for ornamental purposes. Before any design for the city was prepared, Mr. District Surveyor Scrivener—afterwards Director of Commonwealth Lands and Surveys—following upon a close examination of the country, reported that by damming back the waters of the Molonglo to the 1,825 feet level a considerable area of water of beautiful form could be obtained at a minimum expense for earthworks. The proposal, as outlined on the schematic plan and subsequently explained by Mr. Griffin to the committee, is to construct two dams on the Molonglo River, and by certain earthworks form a chain of five ornamental lakes through the city area. These lakes will have a total area of 3,145½ acres, a total capacity of 1,809,392,000 cubic feet, with a shore line of 34½ miles. During a period of average rainfall it is estimated that the flow of the Molonglo will fill them in thirteen months, but that it would take twenty-eight and a-half months during a period of minimum rainfall. The estimates of the cost vary from £559,109, according to Mr. Griffin, the architect, to £897,252, according to the engineer of the Department of Home Affairs. The committee have recommended that some of the works be postponed, with an approximate saving of £440,000.

The Association of Municipal Corporations having considered the proposals to form a Ministry of Public Health, their Law Committee will recommend the council of the association, who will meet on June 14, to pass the following resolution:—"That inasmuch as the conservation and improvement of the public health call for the exercise of wide powers of local government touching the lives of the people at many points and involving questions not only of public medicine, but also of engineering economics and finance, and as these powers have been for many years entrusted to publicly elected bodies under the supervision and regulation of the Local Government Board, and under this system there has been a steady and progressive improvement in the health of the people, this council is of opinion that if any further consolidation or extension of public health powers is desired it should be attained by a development of the present organisation and the recognition of the Local Government Board as the Central Public Health Department."

All will regret the retirement of Mr. J. D. Crace from the presidency of the Incorporated Institute of British Decorators, owing to failing eyesight. Mr. Crace occupied the position of President from the time the institute was incorporated in 1899. His scholarly attainments and wide knowledge of every branch of decoration have proved invaluable to members, and every reader will hope he may be spared for many years to give the institute the benefit of his knowledge and advice. Mr. Mawer Cowtan Cowtan, the principal of one of the leading firms of decorators in London, and who is also President-Elect of the National Association of Master House Painters and Decorators, will doubtless fill the position with dignity and usefulness.

In order to ease the present stringency in the supplies of timber, so far as is possible without sacrificing more important interests, the War Cabinet has authorised the importation, under licence, in neutral vessels, of soft-wood from the countries of Scandinavia when it will not displace cargoes of foodstuffs or munitions. The orders which limit the prices of imported soft-wood to those current during the last week of January, 1917, will not apply to timber imported from Scandinavian countries after May 15. It may be sold by the importers at its cost price, delivered to store, plus 10 per cent., provided that the price so calculated does not exceed by more than a third the price current during the last week of January, 1917, for soft-wood of similar quality and description in the same locality. It may be sold by persons other than the importers at prices which are in accord with the foregoing proviso.

At the opening of the annual session of the Church of Scotland, at Edinburgh, last week, Mr. J. A. S. Millar, W.S., Edinburgh, presented the report of the general committee, and moved the deliverance, in which it was said that the general assembly learned with the deepest gratification of the presentation to the Church by Mr. James Paterson, R.S.A., of his picture of Iona, which they accepted with great satisfaction. Dr. Wallace Williamson said Mr. Paterson, as many of them well knew, was one of their most distinguished artists, and they welcomed that beautiful gift. But he saw in it more than a mere presentation of an artistic work. In its theme and in its treatment it was an artist's message to the Church and to the Churches of Scotland. It was a picture of Iona carried out in that delicate, fine artistic way which was characteristic of all Mr. Paterson's work. But he had given a name to it as a member of the United Free Church, and an elder of the United Free Church, and even greater than that a Dumfriesshire man—(laughter)—which indicated subtly and delicately the meaning of his message "Iona, which is the mother of us all." It was a call back to the fountain-head, to the rock out of which they were hewn. He was sure they all deeply appreciated Mr. Paterson's gift.

At the Manchester Consistory Court last week Chancellor P. Vernon Smith granted a number of citations relative to the placing of memorials to soldiers killed in the war in churches in the diocese. At St. Matthew's, Crumpsall, stained-glass windows are to be put in, and at St. Gabriel's, Middleton Junction, a brass cross is to be placed in the sanctuary, to the memory of the fallen. In memory of soldiers and sailors belonging to the parish of St. James's, Bolton, the south-east transept of the church is to be converted into a side chapel, with a memorial Communion-table. In memory of Alfred Boardman, killed on the Somme on July 1, 1916, a carved oak reredos is to be placed in the Church of St. John the Evangelist, Cheetham, and a brass tablet is to be put up in the Church of St. Catherine, Baron-on-Irwell, to the memory of Adam Cordwell.

The project of demolishing certain interesting old Georgian houses in Golden Square, near Regent Street, and erecting thereon a theatre of the "variety" order seems to have aroused the violent opposition of the inhabitants. The square was built somewhere about 1684, and was known originally as Golding Square—Golding being the person who built it. Historically it is associated with Anastasia Robinson, the actress who married Lord Peterborough, a hero of Spanish wars; with Mrs. Cibber, also of theatrical fame; with Angelica Kaufmann, the artist; with Lord Bolingbroke, the statesman; and with Cardinal Wiseman. The strength of the case of Golden Square appears to rest on a special Act of Parliament passed in the reign of George IV. for the preservation of the amenities of the square. The pivot, therefore, might be said to be the interpretation of the word "amenities." Does a theatre—even of the "variety" order—threaten the "amenities" of any given place? The people of Golden—or Golding—Square, if they fight it out, will help to decide a point probably not previously raised.

The annual meeting of members of the Royal Cambrian Academy of Art, Plas Mawr, Conway, was held last week, the president (Mr. Cuthbert Grundy) in the chair. All the officers and committee were reappointed. Five vacancies in the ranks of the members have been caused by death in the past year, those who have passed away being Mr. Anderson Hague and Mr. Frank Longshaw, both of Deganwy, Mr. Richard Short, of Cardiff, and Mr. John Parker, of London. One of the associates who died during the year was Mr. W. B. Boadle, of Liverpool. Some candidates were presented for election as associates, but none were elected.

TRADE NOTES.

The 100,000-gallon reservoir at Severalls Asylum, built some time ago, has been under constant observation by the engineer, owing to the fact that this was the first contract upon which he had specified waterproofed cement. The powder Pudlo was the medium utilised, and we are notified that the engineer has written to say the results are perfectly satisfactory.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

***Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.

Telegrams: "Timeserver, Estrand, London."
Telephone: Gerrard 1291.

RECEIVED—J. H. and Co.—E. H. S. and Bro.—G. B.—J. D. R., Ltd.—A. J. B.—W. O. and Son.—B. R. Co., Ltd.

A. J.—Yes.

L. K.—Please send.

REMUS.—Thanks, but lack of space hinders.

E. R. R.—You cannot trisect an angle mathematically. With regard to your last remark, look up a letter which the late Mr. F. C. Penrose sent forty-seven years ago to our other paper, the *English Mechanic*, to which he was a not infrequent and always valued contributor. You will find it on p. 329 of the issue of June 24, 1870.

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June 6, 1917. Volume CXII.—No. 3257.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.2.

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OUR ILLUSTRATIONS.

Leicestershire County Council proposed Buildings, Grey Friars, Leicester. Messrs. Everard, Son, and Pick, Architects.

A Country House in Wiltshire, near Salisbury. Messrs. Alfred H. Hart and P. Leslie Waterhouse, FF.R.I.B.A., Architects.

St. Barnabas Church, Mitcham, Surrey. Mr. H. P. Burke Downing, F.R.I.B.A., Architect.

The Problem of the Small Dwelling and its Solution. Two sheets of typical examples by Mr. Robert Thomson, Architect.

Currente Calamo.

The list of birthday honours is a credit to the comprehensiveness of the most Radical of Prime Ministers. Says the *Times*:—"Mr. Lloyd George, after some hesitation, seems to have swallowed the system whole. For sheer bulk his recommendations will challenge comparison with those of any of his predecessors, none of whom can afford to cast a stone at him. Three viscounties, five baronies, twenty-five baronetcies, and fifty knighthoods 'attest' (as Gibbon would say) 'the variety of his inclinations.' We do not suggest for a moment that all of them, as many have been in the past, are a mere exchange either for 'cash down' or for Parliamentary docility. Here and there in a dreary waste of baronets one encounters a name like Sir J. G. Nairne, whose signature is a household word, or Mr. J. W. Flavelle, the devoted chairman of the Canadian Munitions Board. But the old atmosphere of party bargaining hangs heavy over the List." The new viscounts include Lord Devonport, who, presumably, gets his step as a consolation prize for his non-success as Food Controller. Two Royal Academicians get knighthoods—both well deserved. They are Mr. William Hamo Thornycroft, R.A., the sculptor; Gold Medallist Royal Academy of Arts, 1875; elected A.R.A., 1881; R.A., 1888; Medaille d'Honneur, Paris, 1900. His principal works include the statue of the Queen in the Royal Exchange, that of General Gordon in Trafalgar Square, that of Cromwell at Westminster, and the Gladstone Memorial in the Strand; and Mr. Arthur Stockdale Cope, R.A., the portrait painter, whose sitters have included King Edward VII., King George, and the Prince of Wales. He has exhibited regularly in the R.A. for over forty years. "No architect need apply," seems to have been Mr. Lloyd George's maxim this time.

It has been decided to take over a part, at least, of the Victoria and Albert Museum for the accommodation of the Board of Education and the staff. The Imperial Institute, which had been previously selected for this purpose, is to be devoted to other uses. The Trench Warfare Department, which occupied part of the Board of Education's premises in Whitehall, is to find a place in the building in Millbank of the British-American Tobacco Company, who, upon being informed of the needs of the Government, immediately offered to surrender their headquarters, on the understanding that other premises should be found for their staff. Arrangements are being made with an hotel to supply the necessary accommodation. Certainly the increasing appropriation of our available public buildings seems governed more by caprice than common sense. A great museum building such as South Kensington, with its lofty halls and open spaces, is very unsuitable for office work, and its conversion will entail an enormous amount of expensive reconstruction. That seems to be the last consideration with our present rulers, who, moreover, have no regard at all to the injurious suspension of the intellectual life of the nation, the effects of which are beginning to be unpleasantly visible. The original closing of the galleries and museums, however, was carried out in spite of the almost universal protests of the educational leaders of the country, so that it is futile to complain.

We are glad there was such a well-attended meeting of the Property Owners' Protection Association at the Cannon Street Hotel last Thursday, and that the protest registered was so emphatic. Mr. Evans said that private enterprise in the past had fully supplied all needs for houses. They had evidence that 97 per cent. of the houses which had been provided, including working-class houses, stood to the credit of private enterprise. He considered that after the war private enterprise would take up building, supply all the needs of the people, and all it wanted in the meantime was, perhaps, some financial assistance in the way of easy loans. If public money was to be used at all in building it should be at the disposal of those people who were best able to do the work. The only test for loans should be that they went to the quarter where the work was actually done at the least possible price. That was the principle he wanted the Government to go upon. That is the one safe principle, and if it is ignored the Government will blunder as badly as the food controllers have done. For the rest, we again remind readers that the Bill to amend the Act, which has so unfairly hit property owners, and which has now gone to the Lords from the Commons, gives power to affected tenants to deduct from current rent or to recover in any other way any rent paid since November 25, 1915, which is above the "standard" rent—that is, the rent for which the house was let at the beginning of the war. It is iniquitous that the amending Bill should be retrospective, as is proposed, and that landlords and mortgagees should have to repay excess rents and interest over a period of eighteen months or more, when a large proportion of the money has been disbursed in the shape of rates and taxes.

Mr. Gerald du Maurier, last Friday, distributing prizes at the City of London School to students proficient in Shakespeare and the English language, eulogised the future London—the most beautiful city in the world—under a future Minister of Fine Arts. "There would be no mean streets," said Mr. du Maurier; "no tawdry palaces, no jerry-built houses, no post-futurist-vorticist-cubists, no 'anyist' pictures or statues to wound the sight and mar God's beautiful world. Thanks to such teaching in the study of Shakespeare as the boys in the City of London School enjoy, there would be no quarrel whether a picture was by Romney or by Humphrey, whether a settee was made by Chippendale or by Hepplewhite, or by the local carpenter. A thing of beauty is a joy for ever, and a work of art is not a cheque. There would be no doubt whatever whether a thing was made in Germany. Thanks to the Minister of Fine Arts and to Shakespeare, who grouped his wonderful words as Nature did her wild flowers, there would be no commonness of spirit, no ugliness of diction, and everyone in London would speak beautifully." Let us all hope so. Few have urged the necessity for a Ministry of the Fine Arts more persistently than we have done, but if it is to be as full of round men in square holes as some of our recently chosen Ministries, and as irresponsible to public opinion, we had rather wait a while till we have a Government graced with the gift of judicious selection!

Our American friends are as much interested in housing as the Board of Agri-

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culture or the Local Government Board are, and quite as ready to do without the architect. Perhaps our own authorities might go one better, and offer a set of plans gratis—say as a premium to subscribers to *The Board of Trade Journal*. To facilitate the adoption of our suggestion, we append the advertisement of one enterprising American magazine in the *Literary Digest* of New York:—

ARE YOU INTERESTED IN A HOME? Send to-day for wonderful book, beautifully printed, showing exterior views and floor plans of 14 new homes. See the latest ideas in design and arrangements of rooms. Enclose 6c. in stamps, and we send the book *free* just to show you the kind of homes we will publish every month in the new *Touchstone Magazine*. With each advance subscription we will give free complete set of architect's working drawings *of any Touchstone home shown in Magazine during the year*. These

COMPLETE HOUSE PLANS FREE

save you $100 to $250, which is the price any architect would charge you. Besides showing house plans, the new *Touchstone Magazine* will give expert advice on materials, will help you in the selection and arrangement of furnishings, will give you just the hints and helps you need in planning the interior and exterior of your home, including grounds, gardens, etc. In addition to matters concerning the home, it is devoted to Art, Music, Fiction, Poetry, Architecture, Gardening, Education, the Stage, Home Making, and the Crafts.

HERE IS OUR OFFER

The *Touchstone Magazine* for one year	$4.00	All for $4.00
The *Touchstone Magazine* for three months free	$1.00	
Your own selection of any Touchstone House Plan published during the year, value at least	$100 to $250	

The *Touchstone Magazine*, Room 127, 118, East 30th Street, N.Y.C.

Let no one hint that this liberal offer is "the lie direct," or that "the value at least" is over-estimated. A cursory study of "As You Like It," Act V., sc. 4, will help any advertisement writer to use "the quip modest," perchance with even more success than the enterprising magazine, which has evidently taken its title from the clown "filled with quips and cranks" whom Shakespeare immortalised.

Now that photographs are admitted to the Academy, there is really no reason why more architects should not take their own; and, as a start, we strongly recommend the investment of a shilling in the purchase of a really practical little manual of "Commercial Photography," published by Messrs. Henry Greenwood and Co., Ltd., 24, Wellington Street, Strand, W.C., whose long proprietorship of the *British Journal of Photography*, the representative journal of the art, is a guarantee of the soundness of the information it contains. On page 14 *et seq.* will be found some most useful hints about the photography of interiors, and the very necessary, but too often neglected, blocking up of windows during part of the exposure. Then follow similar valuable hints with regard to the photography of shop fronts, paintings, furniture, houses, gardens, and the like. Our praise of this excellent little text-book is well deserved, if, perhaps, not altogether disinterested. We do our best with all photographs which reach us for reproduction, but sometimes wish that best were made possibly better by a little easily acquired familiarity with the conditions under which the photograph should be taken, and which are really very easily mastered when explained by a competent expert like the author of this manual.

The reception of the Rev. John Charles Cox, LL.D., F.S.A., into the Church at Downside Abbey, remarks the *Tablet*, is a piece of news which will be read with interest by those who know his work on ecclesiological subjects, and without surprise. Born in 1843, and educated at Repton School and Queen's College, Oxford, he has been a keen life-long student of all that pertains to English parochial life, its churches and organisation, especially in the Mediæval period. Archæological research has been at once his life-work and recreation, and a long list of works attests his industry and enthusiasm, and has won for him a position as an acknowledged authority whom few would care to dispute. A former editor of the *Reliquary*, the *Antiquary*, and the *Derbyshire Archæological Journal*, he is also the editor of Messrs. Methuen's series of Antiquary's Books, to which his friend Cardinal Gasquet was a contributor, and for which he has himself written important volumes on the parish registers of England, churchwardens' accounts, sanctuaries, and the English parish church. These are but a few of the works from his pen, the last of which are "Preaching and Pulpits in Mediæval England" and "Bench Ends in English Churches," published by the Oxford University Press. "These studies," remarks the *Tablet*, "and the definite conclusions to which they led him in the teeth of what Cardinal Newman called 'the Protestant tradition' had, doubtless, no small part in preparing the way for his reception. He is not the only one who has found his path to Rome through the Record Office."

Belgian artists have not been long in discovering that the Thames Valley is rich in landscapes with wonderful atmospheric effects. Many of them have settled at Richmond, and among them M. Emile Claus, who is now exhibiting his work at the Goupil Gallery. The landscapes are fresh and low-toned, and M. Claus's treatment of water, with its lights and reflections, is very clever. The Goupil Gallery evidently does not desire to attract the attention of the pacifists, for on its doors it bears a notice stating: "This gallery is not open to enemy aliens, conscientious objectors, pro-Germans, advocates of an immediate or inconclusive peace, nor to persons engaged in any work or propaganda the success of which would (in the words of the Home Secretary) discourage our friends and hearten our enemies."

Mr. George Andrew Hobson, M.I.C.E., of Coverdale Lodge, Queen's Road, Richmond, Surrey, late a member of the firm of Sir Douglas Fox and Partners, 56, Moorgate Street, E.C., who took part in the construction of the Mersey Tunnel and Railway, and was the designer of the Victoria Falls Bridge, and who died on January 25, aged 62, left property of the value of £58,825, including personalty of the net value of £56,497.

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION.—III.

By ROBERT THOMSON.

(*With Illustrations.*)

Defective housing is the cause of much disease. It has been proved that it is largely responsible for the appalling waste of life which consumption entails, and as statistics show that the death-rate from phthisis and other diseases of the respiratory system is abnormally excessive among the occupants of those dwellings in which the one and the same small apartment has to simultaneously serve both as living room and kitchen, they clearly prove that this type of dwelling is *not* a health-promoting one. The excessive prevalence of such diseases in dwellings of this type is due not to any single cause, but to the cumulative effect of many causes.

To begin with the overheated air of a kitchen is never invigorating, but when vitiated and humidified, as it inevitably is when the apartment has to serve as living room as well as kitchen, the combination of heat and moisture which this double use entails, provides the ideal atmosphere for the rapid propagation of consumption and other germ diseases. As such apartments are usually very small, overcrowding as well as overheating is almost inevitable, and when these three evils are co-existent each intensifies the disease promoting properties of the others, thereby correspondingly increasing the dangers with which the occupants have to contend.

Of systematic ventilation in such dwellings there is none. In all existing types of cottages the chimney, the door, and the open window are supposed to provide for all the ventilation required, but whatever ventilation these supply is merely accidental and quite unreliable. For example, the ordinary chimney, even when newly swept, is never sufficient to maintain the air contents of the kitchen in a condition to fit this apartment for use as a living room, and it is obvious, therefore, that the gradual accumulation of soot in the flue must correspondingly reduce its capacity for ventilation. It may even be that a closed fire range, which is often installed to secure efficiency and economy in cooking, keeps its ventilating capacity continuously at the vanishing point. Should fresh air be sought in order to relieve the stuffiness of the apartment, the only supply obtainable is by means of draughts created by the haphazard opening of doors and windows, and as most people know to their cost, draughts in an overheated atmosphere are a fruitful source of catarrhal troubles.

In the majority of such dwellings the small overheated and overcrowded kitchen in addition to serving as living room has to do duty as laundry and nursery as well. Probably for laundry purposes, which in wet weather include drying the rain-sodden garments of the occupants and their clothes from the wash, it may do quite well; but, for the upbringing of young chilren, it is certainly about the very worst type of nursery that could have been devised, and there can be no doubt whatever that the debilitating quality of its atmosphere, its draughts, the wide and violent fluctuations in temperature which these produce and the catarrhal troubles which they entail, all contribute to and are largely responsible for the great waste of child life which is such a terrible blot on our civilisation. It is further responsible for the scalding accidents to children which are so frequent. In small dwellings defective sleeping accommodation usually accompanies a

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defective living room, and when this is the case, the drawbacks, and even dangers, with which the occupants have to contend are still further intensified. The tenement type of small dwelling, which may be truly called Scotland's curse, provides a typical example of this intensification. Not only has the one small apartment to serve as kitchen, living room, scullery, laundry, and nursery, but it has, in addition to these multifarious uses, to do duty as the principal sleeping apartment as well, being usually the bedroom of the parents and the younger children.

In this connection I cannot do better than quote the following, which appears in the current issue of *The Housing Journal*:—

An important experiment was carried out some time ago by the chief sanitary inspector of Glasgow, in order to prove if the difference between a ceiling 8 ft. in height and one 9 ft. in height affected the conditions of the air in the houses at night. Two houses were selected, both consisting of two apartments—a room and a kitchen. On the night of the test the tenants in each case kept both the kitchen window and the room window open three inches for ventilation to the outer air

Samples of the air were taken in both houses at the same time, in the doorway between the kitchen and the bedroom, 5 ft. up from the floor level, on March 17 last. Four jars filled with water were used, labelled A and B respectively in each case.

The details with regard to the houses are as follows:—

(1) Size of house, 2,225 cubic feet; height of ceiling, 9 ft.; inmates, 2 adults and 5 children, equal to 4½ adults; inside temperature, 54 deg. Fah., and outside temperature 44 deg. Fah.

(2) Size of house, 2,208 cubic feet; height of ceiling, 8 ft.; inmates, 3 adults and 3 children, equal to 4½ adults; inside temperature, 54 deg. Fah., and outside temperature, 44 deg. Fah.

The result of the experiment in the first house showed A jar to be 15.9 parts of carbonic acid per 10,000 parts of air, and B jar 17 parts.

In the second house, A jar 20.3 parts of carbonic acid per 10,000 parts of air, and B jar 23.6 parts.

While these tests reveal the deplorably bad condition of the air contents of the apartments tested, the results shown are no worse than what could have been expected. The decay in the physique of tenement-reared families, which is notorious, provides evidence which should long ere this have put an end to this monstrous type of dwelling.

Bad though the conditions in regard to air space in the tenement dwelling undoubtedly are, in the case of cottages erected to the Government's model plans they would be even worse. For example, the air space in the two sleeping apartments in each of the two Glasgow houses quoted is only a trifle less than the total of that in the three bedrooms of the officially planned house when their sizes are in strict accordance with the Committee's "Desirable" standard, but as it would be necessary, in order to conform to the Government's model plans, to construct the smallest of these bedrooms—a box-like affair measuring only 8 ft. each way—without a chimney flue or other equivalent means of providing adequate ventilation, the appalling condition of the air contents of this apartment in the morning can be more easily imagined than described.

It may be mentioned that the committee, evidently beginning to awake to the fact that this apartment is not what it ought to be, now suggest that an air-brick be inserted in an outerwall of such flueless bedrooms; but they do not yet appear to be alive to the further fact that an air-brick in an outer wall of a room without an efficient exhaust flue cannot effectively ventilate that apartment.

In the two other bedrooms which have each a fireplace the air contents may be, and indeed very often are, stagnant. Tests have proved that without a fire, a chimney in an outer wall and an unheated flue even in an inner one are throughout the winter half of the year usually worthless for ventilation purposes. When in outer walls the damp and cold cause the air in them to stagnate, and this, of course, stops ventilation, while when the flues in the inner walls are unheated there is nothing to promote it.

In addition to the vitiation of the air contents of the living room, due to the respiration and skin emanations of the occupants it is necessary to take into account the further vitiation produced by the artificial lighting of the apartment when either gas or oil is employed as the illuminant. This source of contamination adds much more seriously to the many dangers and drawbacks with which the occupants of such dwellings have to contend than most people are aware of. For instance, according to Notter and Frith's tables a gas burner giving with an incandescent mantle a light of 50 candle-power vitiates the air as much as three adults; a No. 5 batswing gas burner of 16 candle-power as much as five adults; a kerosene oil lamp of the same lighting power, as much as seven adults; and an ordinary paraffin oil lamp of 16 candle-power is even worse.

As the whole of the considerable amount of heat generated by such illuminants goes to increase the temperature of the air contents it is not only the vitiation but the serious overheating of the apartment which their use entails that the occupants have to contend with. As it is customary, in districts in which there is a gas supply, to fit a gas-cooker in the scullery, its fumes, like the steam from the old-fashioned copper, "fill the house." In the tenement dwelling it is usually fitted in the kitchen itself.

The prevalent belief is that it is necessary to give the people the primitive kitchen-living-room type of dwelling just described because they are unable to pay an economic rent for better accommodation, but a comparison of the plans on Sheets IV. and V., with the corresponding plans on Sheets II. and III., which were given last week, should at once dispose of this belief, and also of the committee's absurd contention that "economy is so essential that space must be sacrificed to secure it." Economy is, of course, always essential, but the only way to secure it is by utilising space, not by sacrificing space, which murders economy. The plans on Sheets IV. and V. prove the former and those on Sheet II. the latter.

The broad distinction which characterises the plans on Sheets IV. and V. is that they are each perfectly equipped with office accommodation and conveniences; those on Sheet II. being very imperfectly equipped and those on Sheet III. only moderately complete. In no case is the space occupied by the pantry and cupboards included in the houseroom.

Plan Fig. 21 shows a dwelling in which the size of every one of the apartments is in exact conformity with the committee's "Irreducible Minimum"; plan Fig. 23 showing one in which they are all exactly in accordance with their "Desirable" standard, and plan Fig. 30 one which meets exactly the sizes called for in their "Parlour" type.

The fact that the elementary plan Fig. 29 shows that it is possible to give a perfectly equipped six-apartment parlour type of dwelling within a roofed area which is substantially smaller than that of the less perfectly equipped five-apartment dwelling shown in Figs. 19 and 19A, should bring home to experts the absurdity of employing two stairs where only one should be required.

Comparing the plan Fig. 24 with that of Fig. 23 it will be seen that in the latter each of the bedrooms for children is exactly equal in size to the two in the former, and reference to the official plan Figs. 14 and 14A, which is of the same roofed area as plan Fig. 24, shows how the health and even lives of the children are jeopardised by the waste of space which the committee have sacrificed in their futile quest for economy. The same remarks apply to plans Figs. 25 and 26.

The small stair on plan Fig. 22 has been drawn to show what the occupants of the official type of dwelling have to be content with.

It will be noticed that there is a fireplace provided in every habitable apartment of the plans shown on Sheets IV. and V.; but that of the smallest bedroom in each plan could be easily bricked up to suit the requirements of the Departmental and Advisory Committees.

PRINCIPLES FOR DESIGN OF RETAINING WALLS.

The following principles to be observed in the design and construction of retaining walls were recommended in a report of a committee of the American Railway Engineering Association:—

1. For usual conditions of the filling use an angle of repose of 1½ to 1. For dry sand or similar material a slope of 1 to 1 may be used.

2. The maximum pressure at the toe of the retaining wall should never exceed the safe bearing pressure on the material considered.

3. When the retaining wall rests on a compressible material, where settlement may be expected, the resultant thrust, E, should strike at the middle or back of the middle of the base of the wall, so that the wall will settle toward the filling.

4. When the retaining wall rests on a material where settlement may not be expected, the resultant thrust, E, should not strike outside the middle third of the base, except as noted in (5) below.

5. Where the retaining wall rests on solid rock or is carried on piles, the resultant thrust, E, may strike slightly outside the middle third, provided the wall is safe against overturning, and also provided the maximum allowable pressure is not exceeded.

6. In order that the retaining wall may be safe against sliding, the frictional resistance of the base, combined with the abutting resistance of the earth in front of the wall, must be greater than the horizontal thrust on the back of the wall.

7. The filling back of the wall should be carefully drained so that the wall may not be subjected to hydraulic pressure.

8. The foundation for a retaining wall should always be placed below frost line.

9. A careful study should be made of the conditions in the design of each wall, and it should be remembered that no theoretical formula can be more than an aid to the judgment of the experienced designer. The main value of theoretical formulas is in obtaining economical proportions, in obtaining a proper distribution of the stresses, and in making experience already gained more valuable.

The Clayesmore Estate, Pangbourne, has been sold by Messrs. Mellersh and Harding, of London, in conjunction with Messrs. Trollope and Sons, for the purposes of a new Nautical College in connection with the scheme of Devitt and Moore's Ocean Training Ships, Ltd. This college will be for cadets intending to become officers in the merchant service and the Royal Naval Reserve.

The award has been issued in the arbitration proceedings between the London Master Builders' Association and building trade workers, members of fourteen different unions. The men claimed an increase of 2d. an hour on their present rates when engaged on munitions work, and the arbitrator has decided that there shall be an advance of 1d. an hour, the advance to be regarded as war wages.

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THE SURVEYORS' INSTITUTION. ANNUAL REPORT.

The forty-ninth annual report of the Council, presented last Monday at the annual general meeting, shows that the war continues to exercise a marked effect on the membership of the Institution, but it has certainly not lessened the activities of the Council or its energetic officers, who have maintained the meetings, examinations, etc., in a manner which compares well with the lack thereof manifested by some kindred societies. Since last year the number of those connected with the Institution who have lost their lives on active service has been considerably increased, and in addition to this the demand made by the nation on the youth of the country has for the time being cut off the supply of those who would in normal times have presented themselves for examination and come up for election. Nevertheless the membership is well maintained.

—	Honorary Members.	Fellows.	Colonial Fellows.	Professional Associates	Associates	Probationers.	Students.	Total.
May, 1915 ..	24	2,048	72	2,860	53	49	328	5,434
May, 1916 ..	23	2,013	76	2,791	51	63	209	5,226
May, 1917 ..	22	1,998	81	2,656	50	67	140	5,014
	−1	−15*	+5	−135†	− 1	+ 4	− 69	− 212

*New Fellows	76	†New Professional Associates	28
Resigned or died	91	Transferred, resigned, or died	163
	−15		−185

It is worthy of note that for the third time the highest civic honour the country has to offer has been conferred upon a member of the Institution; in November last Colonel Sir William Dunn, Fellow, was elected Lord Mayor of London, former members holding that office having been Sir John Whittaker Ellis, Bart., and Sir David Burnett, Bart. One additional honorary member has been elected during the year, Sir Richard Redmayne, K.C.B., Chief Inspector of Mines, who has been good enough to interest himself in the formation of the new mining sub-division, and has accepted nomination as a member of the Mining Committee.

FINANCE.

The effect of the war on the finances of the Institution naturally continues. The capital investments have been depreciated to the amount of £2,377, while the income from subscriptions in 1916 showed a further decline of £1,526, due mainly to the largely increased number of members serving, who are relieved from the payment of their subscriptions until their return to civil life. Careful administration and economies effected in various directions have, however, enabled the year to be completed without the necessity of any call upon capital being made, and the council may well congratulate members on the manner in which the Institution's resources have stood the strain of the war.

RECEIPTS.

	£	s.	d.
Revenue balance—January 1, 1916	1,697	10	10
Total receipts on revenue	10,077	4	6
Capital account	311	17	0
	£12,086	12	4

PAYMENTS.

	£	s.	d.
Total payments out of revenue (current expenses)	9,134	16	3
Purchase of £1,000 6 % Exchequer Bonds	1,000	0	0
Examination account	242	12	0
Petty cash in hands of Secretary	50	0	0
Cash at bankers and on current account	1,659	4	1
	£12,086	12	4

The council have well responded to the national call for financial support in carrying on the war. During the year covered by the accounts they took up £1,000 Exchequer Bonds, and on the issue of the new War Loan at the commencement of the present year they not only converted their previous holdings in Government Stock, but by arrangement with the Institution bankers took up an additional £5,000 of the Loan. This transaction, however, will not appear in the accounts till the publication of the balance sheet for 1917, the Institution financial year being the calendar year, and not that covered by this report.

THE EXAMINATIONS.

The military requirements of the country occasioned by the third year of the war were accurately reflected in the number of candidates presenting themselves for examination. If the ten candidates who came up for re-examination in their typical subject are left out of the reckoning, it is necessary to go back to 1887, only seven years after the examination system was adopted, to find a smaller total, the number for the year under review, sixty-three, being only one-twentieth of those who sat in the high watermark year, 1913, when the total reached 1,266.

THE PUBLICATIONS.

The reduction in the number of ordinary general meetings, inaugurated last session in order to meet war conditions, has been continued, only six meetings being held. The first was, as usual, given up to the president's opening address, but the following papers were read at subsequent meetings: "Suggestions for the Improvement of Cattle Breeding in Great Britain," by Professor K. J. J. Mackenzie, Associate; "The Repopulation of our Rural Districts," by Mr. Theodore G. Chambers, Fellow; "Some Notes on the Defence of the Realm (Acquisition of Land) Act, 1916," by Mr. Edwin Savill, Fellow; and "The Effect of War Conditions upon the Property Market (Urban)," by Mr. J. George Head, Fellow. The discussion on Mr. Savill's paper was carried over to a second meeting, when the subject was reopened by Lord Parmoor, of Frieth, K.C.V.O., etc.

In addition to the "Transactions" two important reports on Unemployment after the War in Rural and Urban districts were issued. During the year circulars giving information on the following subjects have also been issued: The Government Aircraft Insurance Scheme; the Employment of Clerks of Works for the Measurement of Variations for Settlement of Accounts under Contracts; Relief in respect of Income Tax when the Income has suffered owing to the War; Surveyors' Fees in case of Taxation of Costs; the Agricultural Output; Sole or Sole Remaining Principals in Surveying Firms called up for Military Service; the Registration of Business Names Act, 1916; and National Service

Developments contemplated in the Forestry Museum have naturally been affected by the war, but considerable progress has been made in several directions. The re-labelling of the timbers with a full detailed description of the character of the tree and its timber has progressed, and several new exhibits of an interesting nature have been added to the collection. The exhibits illustrating the timbers required in the war, which were arranged by the Director of Army Contracts and other Government Departments, have now been obtained on permanent loan, and should add considerably to the interest in the Museum.

Another exhibit of timbers from the Museum was arranged and created considerable interest at a large meeting held at the institution on Monday, March 12, to which all those interested in woods were invited. This meeting was attended by many influential people, including the Director of Timber Supplies (Sir Bampfylde Fuller) and the Director of the Agricultural Section of National Service (Mr. J. Harling Turner, F.S.I). Several members of the House of Lords and the House of Commons, in addition to landowners and agents were also present.

THE PROVINCIAL COMMITTEES.

Although the meetings of the Provincial Committees have necessarily been affected by the prevalence of war conditions, and by the additional demands made upon the time of members owing to shortage of staff and the voluntary work which they have undertaken in so many directions, the Council wish to acknowledge the support they have received from members in all parts of the country in connection with their scheme for dealing with applications for exemptions under the Military Service Act, and their inquiry into the working of the Agricultural Holdings Act; and more particularly they thank the local committee for their response to the appeal which was issued in December last for the assistance of surveyors in helping the County War Agricultural Committees to organise and increase the output of home-grown food and timber. In every direction members appear to be taking an active part in this important national work, and the Council are pleased to be able to report that the information they have received indicates that the profession has fully realised its responsibilities and opportunities in this connection.

The year has brought with it a number of military distinctions to members of the institution. Apart from mention in the despatches, the following honours are known to have been gained, though the list is doubtless incomplete: Two C.M.G.s, seven D:S.O.s, one M.V.O., an Order of St. John of Jerusalem, one Distinguished Conduct Cross, thirty-four Military Crosses, three Distinguished Conduct Medals, one Military Medal, and one Meritorious Service Medal. In four cases foreign distinctions have been awarded: The Croix de Guerre of France, the Russian Order of St. Anne with Swords (Third Class), the Serbian Order of the White Eagle, and the King of Serbia's Gold Medal.

But the list of those whose names are recorded upon the roll of honour as having lost their lives on active service is also long, and comprises many members, in addition to the sixty whose names have appeared in previous reports.

OBITUARY.

The funeral of the late Mr. H. M. Townsend, architect, Peterborough, took place in Longthorpe village churchyard on Saturday week. He had been in ill-health for some time, and, following a seizure about a month ago, he gradually grew weaker, passing away on the previous Wednesday morning. Mr. Townsend, who was seventy-two years of age, was a son of the late Rev. Thomas Jackson Milnes-Townsend, Vicar of Searby, Lincs. He was articled at Oxford, and then went to London in the office of Sir Gilbert Scott. He was also for a short time with a Mr. Butterfield, also a well-known name in those days. Later, Mr. Townsend went into partnership with Mr. Mumford, an engineer at Wisbech, and whilst there a branch office was opened at Peterborough forty or fifty years ago. After the death of Mr. Mumford, Mr. Townsend continued in business for himself until 1898, when he took Mr. R. A. Fordham, who had been with him since 1884, into partnership. That partnership continued until May of last year, and was dissolved entirely owing to the conditions produced by the war. Up to a year ago he held the appointment of diocesan architect.

The plumbers' dispute in Midlothian has been settled. The arbitrator has awarded the men a rise of 1½d. per hour, thus raising the wages to 1s. 1d. per hour.

From a Liverpool lady sojourning in North Wales comes a letter stating that farmyard fowls continue, for the second season, to ignore the Daylight Saving Act. Their hour of rising and roosting is still fixed, as for centuries, by solar time.

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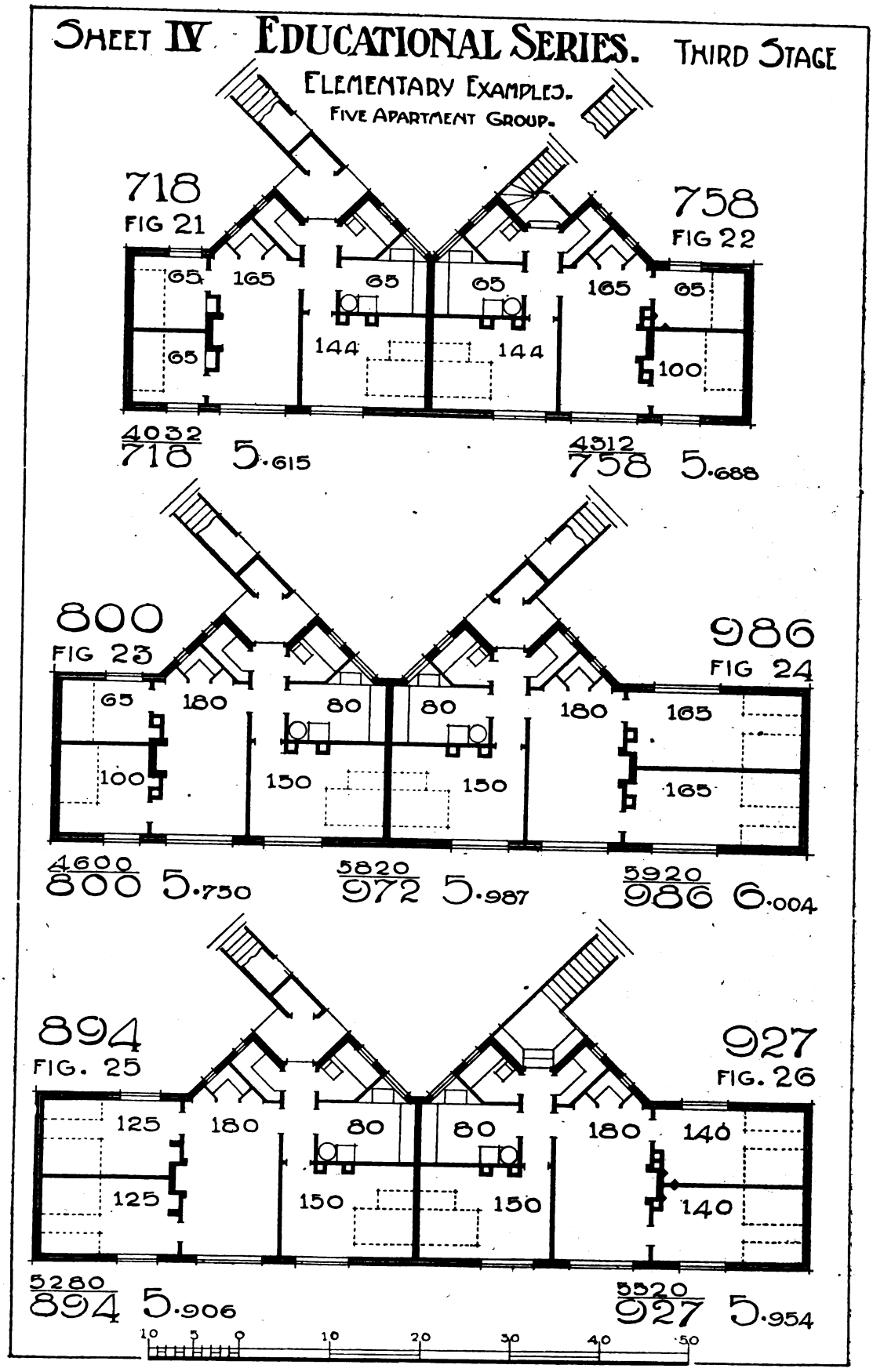

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ST. BARNABAS CHURCH, MITCHAM, SURREY.—Mr. H. P. Burke Downing, F.R.I.B.A., Architect.

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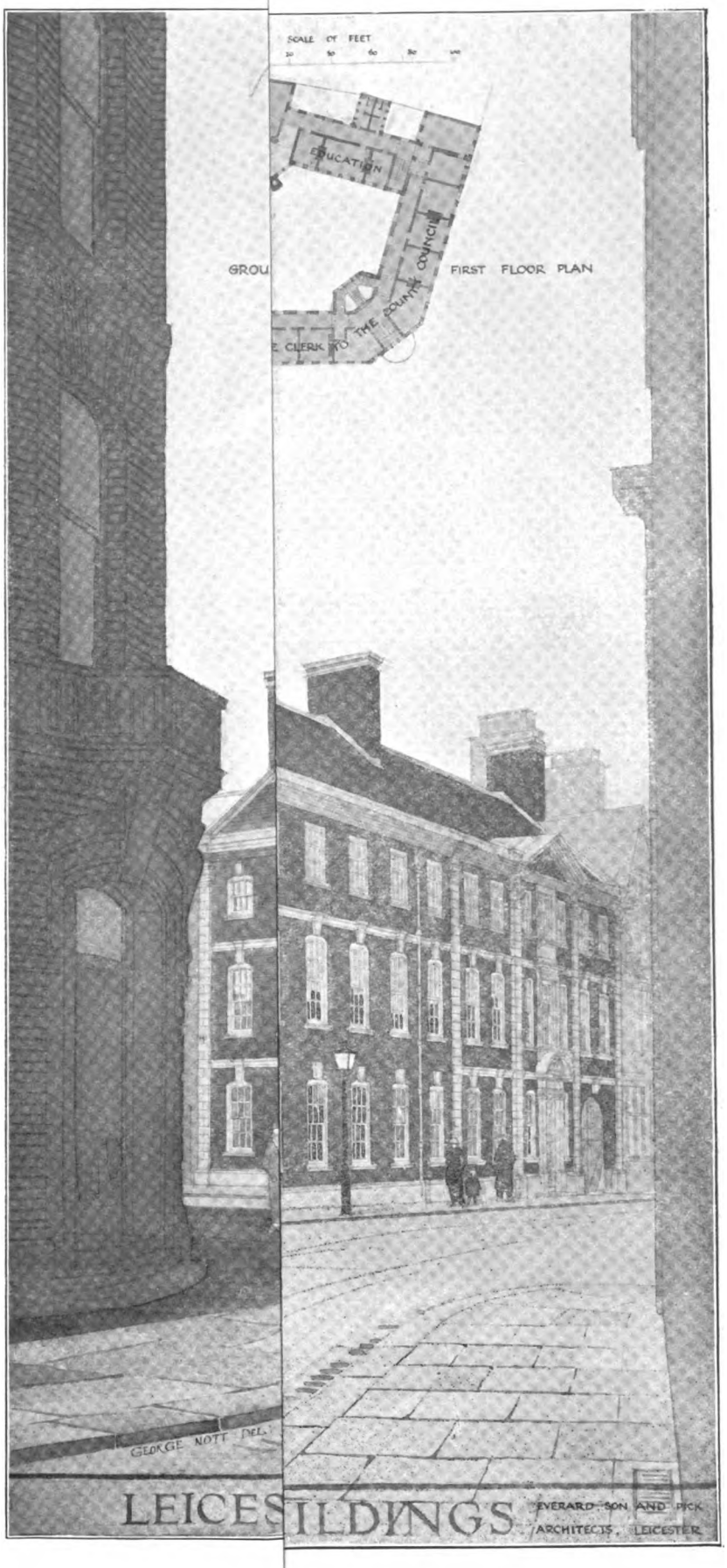

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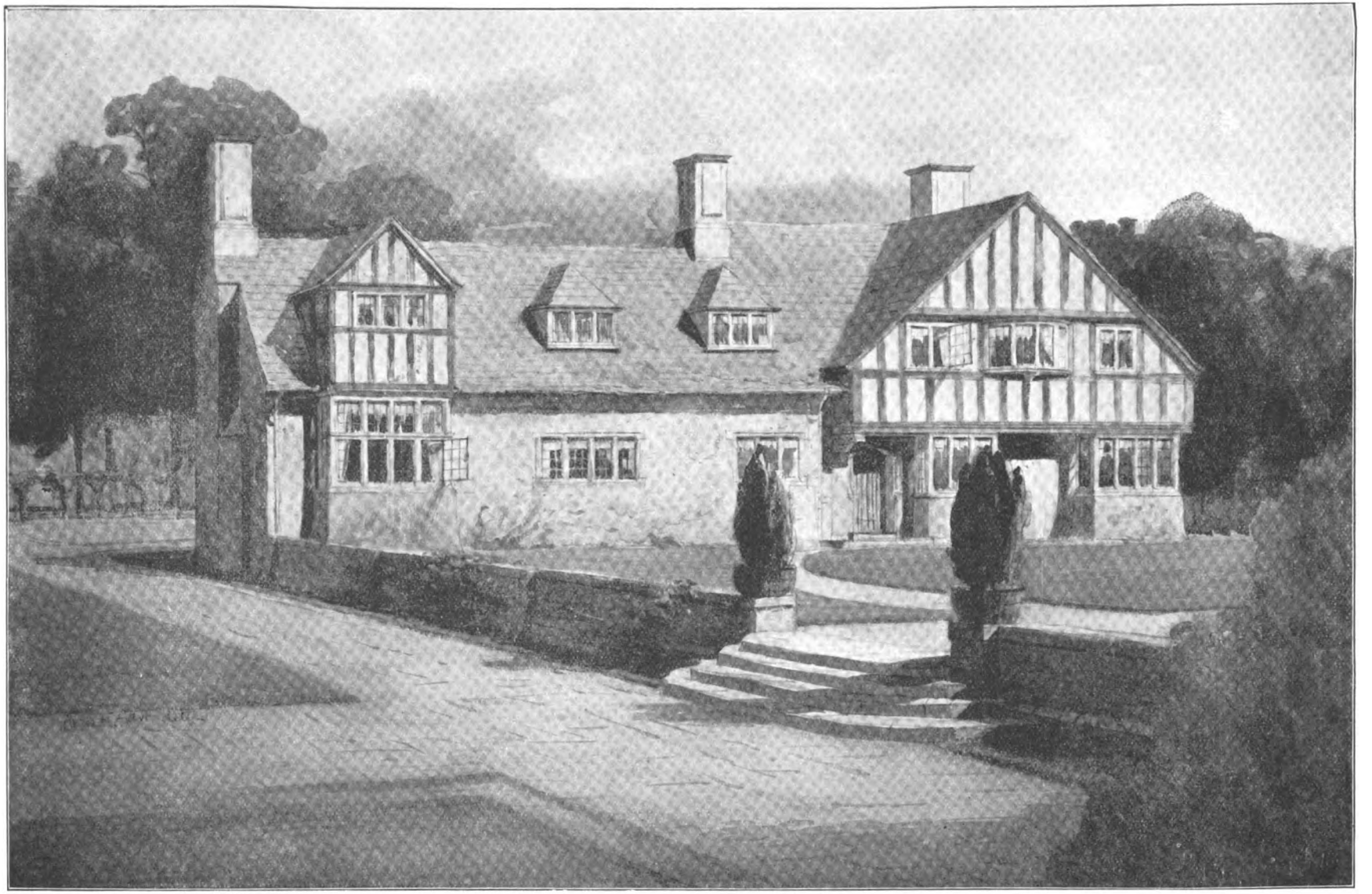

A COUNTRY HOUSE IN WILTSHIRE, NEAR SALISBURY.
Messrs. Alfred H. Hart and P. Leslie Waterhouse, FF.R.I.B.A., Architects.

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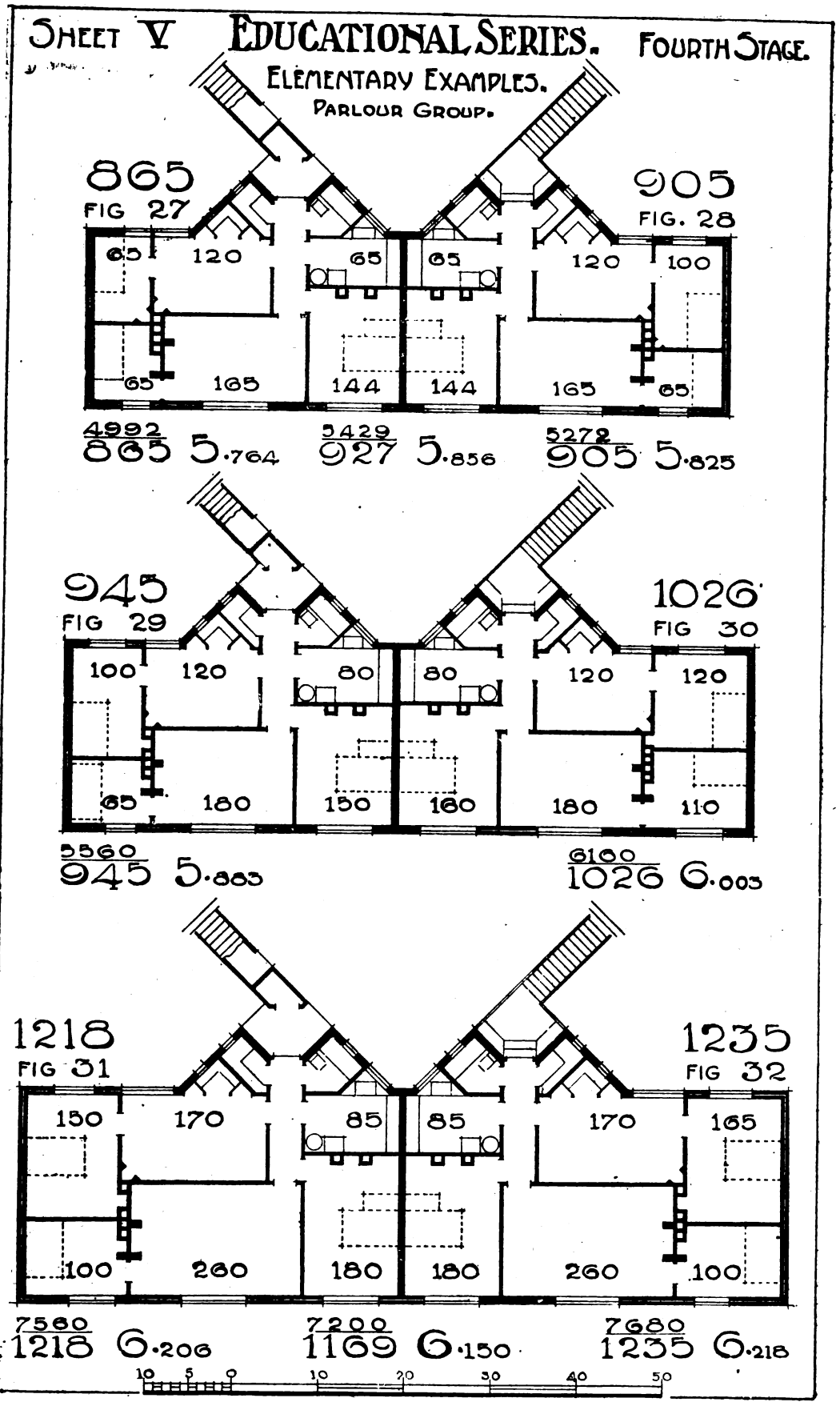

N: TYPICAL EXAMPLES.—By Mr. ROBERT THOMSON, Architect.

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Our Illustrations.

LEICESTERSHIRE COUNTY COUNCIL, GREY FRIARS, LEICESTER: PROPOSED BUILDINGS.

The Leicestershire County Council purchased some time ago, property in Leicester for the purposes of providing a new Council Chamber and Offices, and standing upon the site there is an excellent 18th century building. It was not intended to erect the whole of the new buildings at the present time, but a proposal was made to provide offices for the Education Department only, and it was arranged to place this portion to front Grey Friars, leaving the corner area and the remainder of the site free for future extensions. It will be noticed that the proposed new Education Offices are largely a repetition of the original building, and the endeavour has been made to make the architectural treatment generally harmonise with the original 18th century work. The drawings were made just before the war commenced, and the whole of the work is now necessarily in abeyance. The architects are Messrs. Everard, Son & Pick, Leicester. The perspective view and plans reproduced herewith to-day form part of the Exhibition in the Architectural Gallery of the Royal Academy this year.

A COUNTRY HOUSE IN WILTSHIRE.

This house has been built on high ground a few miles from Salisbury. The graduated stone roof combines well with the mullioned windows and stone dressings, and when the garden is completed, as indicated upon the drawing, the whole should, we think, have a quiet effect, carrying out the traditions of the homesteads in the neighbourhood. The present drawing is shown in this year's Royal Academy Exhibition, and represents a proposed addition which includes a large recreation room on the ground floor and some extra bedroom accommodation over. Messrs. Alfred H. Hart and P. Leslie Waterhouse FF.R.I.B.A., of Gray's Inn, W.C., are the architects.

S. BARNABAS CHURCH, MITCHAM, SURREY.

The exterior view of Mr. Burke-Downing's new church at Mitcham is from a photograph in this year's Royal Academy Exhibition.

The church, when complete, will accommodate 800 people. As it now stands the building consists of nave of four bays and chancel of two bays, south aisle, and at the eastern end of this aisle, organ chamber and vestries. A lofty belfry with stone saddle-back roof at the east end of the church makes provision for bells and a clock. The stone arcade runs continuously from the east end of the chancel to the west end of the nave, the arches springing from stone piers spaced 21. ft. from centre to centre. The nave and chancel are of the same width and height, and the aisle is of nearly equal height. The length of the church is 140 ft. and the width 47 ft. It is built mainly of Crowborough purple-brown bricks, with Portland stone and Ridge Park. The roofs are tiled—the walls internally are plastered. The paving of the choir and sanctuary is of white Mansfield stone and red Wilderness stone. The builders were Messrs. Allen Fairhead & Son, of Enfield—Mr. H. P. Burke-Downing, F.R.I.B.A., of Westminster, was the architect. We illustrated the parish hall next this church in our issue of February 12, 1909, and a general view of the church itself as originally intended with a central tower on June 25, the same year, from the Royal Academy of that season Mr. Burke-Downing since then has entirely altered the design.

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION.

We have already published two of Mr. Robert Thomson's articles on this subject (in our issues of May 23 and 30), accompanied by three pages of typical plans illustrating his suggested improvements of the official schemes put forward for adoption by housing authorities and others about to erect standardised cottages and small houses. To-day we give Mr. Thomson's third article and two more sheets of his plans, which deal with this question in a practical and economic manner.

BUILDING AND ORNAMENTAL STONES OF AUSTRALIA.

Our readers know, of course, that the marble in Australia House in the Strand has been supplied specially from Australia, and they and the general public will shortly have opportunities of judging of its beauty. Of the wonderful wealth of Australia, however, in building and ornamental stones of all sorts few of us probably have any adequate conception. The British architect and builder should not fail to get, and study, the sumptuously produced volume, just published by the Government of New South Wales, which we have received from the High Commissioner for Australia. With its lucid and business-like letterpress and its excellent coloured and half-tone illustrations it is, indeed, a contrast to the supineness of our own Government here at home, or the niggardly fashion when anything like facilities for publicity are offered to productive interests. When some of our own stone merchants remember how Cornish and Aberdeen granites have been refused in favour of Norwegian in Government contracts, and the supercilious indifference of the average official when information is sought likely to help business in foreign and other lands, one is really tempted sometimes to follow the advice recently tendered by an enthusiastic and patriotic Antipodean, who adjured us to persuade all Britons to emigrate to Australia *en masse*, and found there the "Britain of the Southern Seas," and make the old island a naval and mail station for the navies and aerial post-aeroplanes of the near future.

The specific literature at the command of the architect and builder with regard to Australian stone is scanty. It was not till 1838 that marble was first used. In the 1851 Exhibition here there were a few exhibits—principally as paper weights; there were some at Paris in 1855, and a few more at our own Exhibition of 1862. But at the Franco-British Exhibition of 1908 a really fine display was accorded a Grand Prix, and the juries reported most eulogistically on the richness of New South Wales in those excellent materials. It was the favourable reception of the two books published on this local product of New South Wales that brought about the enlarged scope of the present work, in which the matter is treated as a Commonwealth one.

One remarkable characteristic of the Australian marbles is their extraordinary compression strength. Thus a 3-inch cube of Caleula marble sustained a weight of 84.36 tons before crushing, as against Barren Jack granite breaking under a pressure of 68 tons. Several of these tested specimens are shown in the text in their fractured condition just as taken from the 100 tons testing machine; and the figures are of special interest. It is worthy of mention that this great compactness of texture is a distinguishing characteristic of Australian marbles, and although practically only the surface of the quarries has been worked, yet solid blocks are obtained, and in the dressing for market, and in the finished article, no stopping is required, consequently, it lends itself to thin cutting—a feature of great commercial value.

Although so many localities are now known from which excellent lithic building material can be procured in New South Wales, yet the industry is only in its infancy. The prospective development of the trade, however, augurs well its extension of the industry, although at the present time the value of imported marbles and granites is somewhat considerable. Much modern machinery has been installed for quarrying, cutting, and polishing; in fact, plant sufficient enough to comply with all architectural demands likely to be made upon it for some time to come is now well established. The demand for stone for monumental purposes is very large, but the supply is obtained almost entirely from abroad, in spite of the fact that so much excellent material lies at the user's very door, and needs only industrial development. Building stone, such as sandstone, has, of course, been used in Sydney since the city's foundation, and this material, being ready to hand and in great abundance, was early utilised, with the result that some very fine and noble edifices adorn the streets of the State capital, and it has even been used in architecture in Melbourne, Adelaide, and other large towns. In recent years Australian architects, desiring to materialise their conception of beauty, but wanting variety of material, have turned to sources of supply other than the Sydney sandstone, and in searching for material to meet their requirements it was discovered that, in building and ornamental stones of first quality, Australia in general, and New South Wales in particular, has few compeers. Although practically only the surface has been scratched, the indications show that the supply of building material is inexhaustible, and one is, therefore, perhaps justified in stating that this unquarried material represents a latent wealth that is of sufficient importance to give employment to thousands of workmen, and will be in the future a considerable factor in the prosperity of the island continent, especially when it is remembered that Belgium employs at the present time 37,000 men in its stone and marble quarries. There is every reason to believe that many more beautiful stones will yet be unearthed when increase of population brings an increased demand; and, further, the specimens exhibited in London, together with the illustrations and information herein given, will, without doubt, carry conviction concerning the extent of Australian wealth in building and ornamental stones. The output is certain to increase, inasmuch as the "sky-scraper" is a forbidden structure here, and so steel is not likely to enter into competition with other building material in the proportion that obtains in some other countries.

It is, perhaps, not too much to say that almost every variety of colour will be found in the Australian marbles. At any rate, the degrees of colour from known specimens of to-day may be said to cover a very wide range—in fact, the colours are so variable that it would not be easy to give a colour classification. A beautiful black marble occurs at Windellama, in New South Wales—comparable almost with the black marble of Belgium; and in the same class could almost be placed the Victorian Buchan marble, used so effectively in the decoration of the new public library at Melbourne. Red is a colour frequently found, and is well illustrated in Red Borenore, Nemingha, Attunga, Fernbrook, and many others. In New South Wales no distinctly blue marble is yet known, but one with a bluish stain has been found at Marulan, New South Wales. Some fine brecciated marbles occur in New South Wales; the most decorative of all is probably that from Attunga, which, when polished, shows exceptionally big fragments, and so producing figures which would make most decorative majestic columns in large buildings. Amongst yellows the rich gold from Rylstone is at present unique amongst Australian marbles, and the same might be said of the beautiful ivory-coloured stone also from that locality. The variegated marbles are of sufficient variety to suit almost any task. The white marbles still require further investigation, only a few being at present known, and in this connection might be mentioned the statuary marble found at Gilmore, Tumut, in New South Wales. Only surface specimens have been obtained, but these are most promising, and are quite equal in quality to Carrara. In the Bathurst district, also, are several very fine white marbles suitable for monumental and other purposes, chief of which is one from George's Plain, now being placed upon the market.

Australia is particularly rich in granites, but, so far, not many have been worked. The finer-grained deep red granite of Gabo is an excellent stone for decoration, as also are those from Tarana of equal texture. Several richly red coloured, coarse-grained granites, the felspar crystals predominating, have recently been brought to light, such as Mudgee, Michelago, Tarana. In grey granites, the varieties are very numerous, but the finest of all is the dark grey of Uralla, which is undoubtedly one of the finest granites yet found in any country, being

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full of life; and an excellent green-toned granite outcrops at Albury, New South Wales.

The sandstones of Australia are of excellent building qualities, but vary in grain, texture, and colour, and so give the architect a wide field from which to realise schemes of architectural designs and beauty.

Serpentines are practically an untouched field, although their occurrence is generally known. Good material is to be found at Port Macquarie, New South Wales, and a polished specimen is here shown. Queensland is also rich in this substance.

Another important quality of Australian marbles and granites is that very few flaws occur in them, so that during their preparation for use, such as turning, polishing, carving, etc., no "filling in" or other methods of cobbling are needed to produce a regular and even surface. This, of course, is a distinct gain.

The long list of available quarries from which the stones are brought occupies about 100 pages. The descriptive notes are excellently condensed; and, besides the very fine illustrations in colour of the various stones, there are some interesting half-tones of the more important buildings in which they have been used.

DETERMINATION OF WEIGHT PER CUBIC FOOT OF SAND.

At the last annual meeting of the American Concrete Institute the Committee on Aggregates reported the results of experiments performed for the purpose of ascertaining the method and apparatus by which the most reliable results in the determination of the weight per cubic foot of sand by different operators under different conditions may be obtained. This work was carried out by a joint committee of the American Society for Testing Materials and the American Concrete Institute. The conclusions are here reproduced:

Remembering that the variables which need to be standardised are (1) the size and shape of the measure, (2) the method of filling the measure, and (3) the amount of moisture in the sand, experiments were made at seven different laboratories on sand of two grades—one coarse, the other fine. With wet sand a much greater range in average weight, average maximum variation and mean variation was obtained. Because of this great range, the conclusions presented in the discussion are based wholly on the results for dry sand.

Seven different methods of filling the measures were tried, namely, A, filled and struck; B, filled and jarred; C, jarred while filling; D, tamped in layers; E, filled and tamped; F, filled through funnel; G, inner tube, and a cone method used in one laboratory only. The lower weights were obtained by methods A, F, and G, while the higher weights resulted from methods C, D, and the cone. The cone method showed least total variation, with methods D and G as second choice, while for mean variation the cone method was lowest, with methods F and D as second and third.

The Bishop of Buckingham (Dr. Shaw) has dedicated, at the parish church, Wycombe, a memorial tablet to three of his sons who have fallen in the war.

Colonel Archibald Samuel Cooper, C.M.G., has been appointed Director of Inland Waterways and Docks at the War Office, in succession to Major-General A. S. Collard, C.B., now Deputy Controller of Auxiliary Shipping at the Admiralty.

Captain Leonard Lane Talbot, R.F.A., who died of wounds in France on April 24, aged 34, was the youngest son of Mr. and Mrs. F. Talbot, of Chester Street, Caversham. He was educated at the Reading Collegiate School, and in early youth left England for Paraguay, where he achieved success as a surveyor.

A selection of works from the Tate Gallery by British painters of the latter half of the nineteenth century has been arranged in Room No. 21 of the National Gallery, next to the collection of works by their French contemporaries formed by Sir Hugh Lane. The room will be open to the public to-morrow (Thursday).

Correspondence.

SOME MISUNDERSTANDING.

To the Editor of the BUILDING NEWS.

Sir,—As I find that some misunderstanding has been caused among our friends by a circular sent out, I believe in March last, by my brother, Captain C. J. Blomfield, from which all mention of my name was omitted, I beg to inform you that as our partnership (Sir Arthur Blomfield and Sons) expired by effluxion of time at the end of last year, I am carrying on my work at the address below as usual, and each of us will (by mutual agreement) continue to serve those of our clients whose business we handled respectively.

Owing to pressure of War Loan work at the Bank of England, I am using my office in Grocers' Hall till after the war, but letters will still reach me if addressed to the Bank.

I am, dear Sir, yours faithfully,

ARTHUR BLOMFIELD (M.A., F.R.I.B.A.)

Surveyor's Office, Grocers' Hall,
Princes Street, E.C. Tel.: Bank 6133.
June 1, 1917.

POSTURES AT WORK.

Numerous departures from the normal posture appear in every degree from a very slight and almost imperceptible curvature to a marked deformity, and produce corresponding deviations from normal health, in many shop and office workers. It is, therefore, of great importance that every effort be made to prevent the establishment of such conditions, or if once established to correct them. With this in view every employer should endeavour to obtain the best possible working conditions for his employees—suitable seats, proper desks or work benches, sufficient light falling upon the work at the correct angle and frequent change of position in work requiring close application. This alone is, however, not sufficient, for unless the workman can be made to realise the necessity for correct posture he will be benefited very little. In most establishments little more can be done than simply to call attention of all workers to the dangers consequent upon the assumption of incorrect postures, adding to the conditions noted above the ever-increasing susceptibility of the individual to tuberculosis as the supply of fresh air reaching the lungs is diminished.

Definite instruction to bend the body at the waist instead of at the shoulders in work requiring close application will, if followed out, not only eliminate the hump on the back, but will surprisingly diminish fatigue. Regardless of what method is pursued in dealing with this important question, two facts should always be borne in mind: One is that a deformity prevented is very much more to be desired than one corrected; and the other is that the sooner a deformity is detected the easier it is to be corrected, and the less serious are the results wrought by it on the individual.

DURABILITY OF CONCRETE IN ALKALI WATERS.

Because various branches of the Government use concrete in irrigated districts, where the alkali occasionally becomes concentrated in the soil, the Bureau of Standards undertook in 1913 an investigation of the durability of concrete in alkali waters.

The work has been carried on in co-operation with the Reclamation Service, the Department of Agriculture and the Portland Cement Association. Some 8,000 specially prepared draintile made under the Bureau's supervision were installed in concentrated alkali soils in the Western States, and a number of these have been taken up and tested each year.

More recently a number of concrete blocks have been made, using aggregates now in use on different irrigation projects, and installed in alkali soils. These are to be examined from time to time for indications of disintegration. The results thus far available show that concrete and cement draintile will disintegrate in some of the soils where they have been tried unless made with the greatest care and of the best materials.

LEGAL INTELLIGENCE.

CARDIFF RESERVOIR CONTRACT.—JUDGMENT FOR £12,388 AGAINST THE CITY COUNCIL.—In the King's Bench Division Mr. Justice Bray gave judgment in the case of Nott v. The Cardiff Corporation. Mr. L. G. Nott, a Bristol public works contractor, obtained the contract to construct the Llwyn On Reservoir. We have previously reported the details of the case. Disputes arose between the parties, and the matter was submitted to an arbitrator, who found in favour of the contractors. Mr. Justice Bray, giving judgment, said the disputes arose mainly owing to the objection by the contractor to do extra work, and the contractor availed himself of the right of appeal from the engineer to the arbitrator, as laid down in the arbitration clause in the contract. Referring to the contractor's claim for rates paid on the railway he occupied, his lordship said he could see nothing to justify him in holding that the arbitrator was wrong in finding that the contractor was not the occupier of the railway, and therefore not liable to pay the rates. The corporation failed on that point, and must now pay the contractor the sum he had paid. Referring to the claims for extra work done by the contractor at the request of the engineer of the corporation, his lordship said that it was clear the engineer had refused to give instructions in writing as provided by the contract. He (the judge) would uphold the arbitrator's findings in favour of the contractor, whose claims would be allowed. The question in dispute between the parties as to the mixing of the cement he should treat as extra work, and would find in favour of the contractor. The award must stand for £12,388 18s. 2d., and the contractor would have the costs. Counsel for the corporation asked for leave to appeal. The judge said he did not think the corporation should appeal, although he was bound to say there were difficult questions of law, and he would give leave.

USE OF SMALL TYPE IN A SALE NOTE.—At Wolverhampton County Court his Honour Judge Howard Smith delivered judgment in an important case affecting the building trade. There had been a new trial of a matter remitted from the Divisional Court in which the plaintiff was William Roe, builder and contractor, of Hartley Street, Wolverhampton, and the defendants, R. A. Naylor, Ltd., timber merchants and importers, Warrington, the object being to recover £41 10s. damages for alleged breach of contract. His Honour said the Divisional Court ordered a new trial because they were not certain whether he had directed his mind to the right principle. He never meant to hold that there was any duty on the part of the defendants to point out the conditions on the sale note, but he thought the plaintiffs failed to discover it, because the defendants printed it in the smallest type, and placed it in a position where an ordinary business man would not have expected to find it, and unfortunately he worded his finding so as to create a doubt in the minds of the learned judges. He meant to find then, as he found now, that having regard to the very small print of the conditions, and the position in which it was placed, an ordinary business man, acting with ordinary care, would have failed to notice it, and could be excused for not having done so. As to this, the evidence was the same as on the first trial. It was, however, shown that the plaintiff was short-sighted, and it was urged that a man of ordinary sight would have seen the conditions. He had the evidence of Mr. Ferbusch, plaintiff's solicitor, who stated that when the sale note was first brought to him he did not notice the condition, and it was only when it was brought to his notice by the defendants' solicitor that he discovered it. He (the judge) had used his own eyes, and he found that the plaintiff never saw the condition, and was misled; he further found that a business man, acting with ordinary care, would be excused for not detecting it. Although the case was sent back for a new trial on the one point that he had mentioned, and dealt with, the defendants, as they were entitled to do, relied upon an alleged custom of the trade that contracts for delivery of timber made by travellers were subject to the goods being unsold by their principals. He had grave doubts as to the certainty and universality of the custom, and even if the conditions before referred to did not appear on the sale notes or quotation, he should still have doubt as to the alleged custom applying to the whole of the timber trade, and therefore he had to find that it was not proved. He gave judgment for the plaintiff, with costs on the higher scale.

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PROFESSIONAL AND TRADE SOCIETIES.

ROYAL ARCHITECTURAL INSTITUTE OF CANADA.—The Council of the Royal Architectural Institute of Canada met in Ottawa on April 28, under the presidency of Mr. J. P. Ouellet, of Quebec. The meeting was very well attended, including a member from Alberta. It was decided to hold the annual meeting in Ottawa on the 1st and 2nd of October next. This will be the tenth gathering; originally the organisation was known as the Institute of Architects of Canada, and in 1909 permission was given to use the prefix "Royal." Three years later the Institute secured a charter for affiliating all existing architectural societies who possessed provincial charters, the members of the provincial societies thus becoming members of the R.A.I.C. After discussion, it was agreed to establish an Institute medal of merit to be presented for competition or to distinguished architects. A committee will obtain designs and settle details. The question of affiliating B.C. architects' associations was also dealt with. A roll of honour of men at the front will be prepared, and Mr. A. Chausse, the honorary secretary, was requested to write every society for lists of members who have enlisted.

Our Office Table.

A meeting of the Society of Architects, at 28, Bedford Square, London, W.C.1, will be held at 6.30 p.m. to-morrow (Thursday, June 7), when a paper will be read on "Coal from Concreted Breeze, Sawdust and Ashes," by R. Goulburn Lovell, A.R.I.B.A., M.S.A. It is claimed that a good fuel can be produced which will flame, coke and incandesce like coal. This will be demonstrated at the meeting. The subject at the present time is of vital importance, and should ensure a full attendance.

One of the most illuminating illustrations of the relative cost of different building materials, according to *Stone*, is furnished by the bids for the construction of the Madison School, at Syracuse, N.Y. It is worth while to consider these bids, which were opened the past month, in detail. The bids in detail were as follows:—A, limestone, $217,158; imitation stone, $215,404; terra-cotta, $215,851; B, limestone, $227,700; imitation stone and terra-cotta, the same; C, limestone, $229,000; imitation stone, $227,000; terra-cotta, $225,400; D, limestone, $210,000; imitation stone, $210,967; terra-cotta, $215,150. Thus it will be seen that out of twelve separate prices quoted, limestone at $210,000 was the lowest. What is more, this figure is $967 less than the lowest imitation stone bid, and $5,150 less than the lowest terra-cotta bid. The most favourable limestone price was no less than $17,700 under the higher imitation stone and terra-cotta bids. On the other hand, to put the matter in an absolutely fair light, the highest limestone bid was $18,033 more than the lowest imitation stone, and $13,850 more than the lowest terra-cotta bid. What is equally striking is the fact that the bidders who put in high figures for natural stone offered inducements of only a thousand or two dollars in favour of the imitation.

The Bridport Town Council have been informed by the Local Government Board that the appointment as medical officer for the borough of Dr. Edwards, who had been a member of the council, was not in order, as a sanitary authority could not appoint a councillor to such an office until twelve months after his resignation. This evidently does not apply to metropolitan boroughs, where a retired councillor can be elected town clerk within a few minutes of his resignation.

At a conference on housing, held in the Melbourne Hall, Edinburgh, under the auspices of the Scottish Labour Housing Association, Mr. Eunson, chairman of the Edinburgh Trades Council, presiding, Mr. Tom Hamilton, Workers' Union, moved that a branch of the Housing Association be formed in Edinburgh. Councillor Graham, who seconded, said they in Edinburgh had an acute housing problem. The tightness of money, the high cost of building materials, and the high cost of labour had stopped private enterprise. Mr. Robert Allan said they would have to see that the houses erected in the future were up to a certain standard. A prominent official in Edinburgh had described some houses at Rosyth as suggestive of bird cages. Doors and windows were so narrow that some of the workers from England had actually to cut their furniture up before they could get it into the houses. It was unanimously decided to form a branch in Edinburgh of the Scottish Labour Housing Association.

The Education Committee of the West Ham Corporation has had under consideration the remuneration received by the architect during the past two years under the conditions of his appointment in 1896 by the West Ham School Board. The architect's agreement is so worded as to make his retaining fee or salary of £100 per annum cover not only his general work as architect to the committee, but the ordering, supervising, checking, and certifying of the whole of the accounts for jobbing repairs, and this work he has carried out for more than twenty years without claiming any fees. Since the war and the consequent stoppage of all new work the loss has become more acute, and for the year 1916-17 the actual out-of-pocket loss on work executed for the committee amounts to between £400 and £500, although the staff and office expenses are reduced to the lowest possible level consistent with efficient supervision. The architect suggested that to reduce this loss he be permitted to charge fees at the rate of 2½ per cent. on the jobbing repairs not executed by contract. The Education Committee recommends that in lieu of the proposal to allow the architect 2½ per cent. on jobbing repairs not executed by contract his retaining fee be increased from £100 per annum to £350 per annum.

In his eleventh annual report, Dr. Houston, Director of Water Examination to the Metropolitan Water Board, refers to the special treatment of the raw Thames water which has been in operation from June, 1916, and declares that the consumers have received a tasteless, odourless, and innocuous water. The treated water has been purer bacteriologically than if it had undergone storage in the Staines reservoirs. From June to March the net saving has been over £8,000. Still more important is the conservation of coal, a commodity of vital use to a nation at war. The New River supply is open to some criticism, owing to the deficiency of storage and of filtration area. The results are very good under normal conditions, but the moment a flood occurs deterioration sets in. To remedy this state of affairs by the construction of engineering works would cost an enormous sum of money. Moreover, the larger reservoirs and additional filters are only really needed on exceptional occasions. The Director has therefore sought to solve the problem. He admits that his first attempt was unsuccessful, owing to taste troubles. Since then, we are told, most gratifying results have been obtained, and some of the members of the Board have had ocular demonstration of the working of the process.

The Building Trades Central Advisory Committee (Operatives), which advises and assists the Ministry of Labour upon matters affecting workmen in connection with Employment Exchanges, has held its third meeting. The committee received a statement with regard to the steps being taken by the Department to assist associations to comply with the recommendations of the Treasury Committee on the audit of claims for repayment under Section 106 of the National Insurance Act, 1911, in respect of unemployment benefit paid by the associations. The committee also considered: (*a*) The best means of avoiding delay in the placing of men sent by Employment Exchanges from one town or district to another; (*b*) the desirability, when appointing Employment exchange officials, whose duty it will be to deal with applicants for employment, of giving due consideration to their qualifications both as regards knowledge of industrial conditions and ability to deal sympathetically with workmen. It was reported to the committee that the Ministry of Munitions had decided to extend the list of occupations for which men are eligible for enrolment as war munition volunteers to include bricklayers and general labourers suitable for munitions or shipyard work.

The Building Prize in the Surveyors' Institution Examination was won by Mr. Henry Colbeck, A.R.I.B.A., of 26, Bramley Road, Ealing, W. Mr. Colbeck is the son of a well-known United Methodist minister, the Rev. Alfred Colbeck, and is twenty-eight years old. He was articled as pupil to Messrs. Glendenning and Hanson, A.R.I.B.A., of Halifax, for four years, and later acted as assistant in the offices of several architects and surveyors in Birmingham and Wellingborough. He came to London nearly three years ago, and last year was elected an Associate of the R.I.B.A. He has been for the last two and a-half years leading assistant to Mr. J. R. Moore-Smith, F.R.I.B.A.

The Philippine Health Service has turned its attention to improving the housing of the poor in the Philippines, where highly combustible and unsanitary nipa structures are now the rule. The Service has constructed a number of model houses from a new fireproof material, consisting of equal parts of cement, sand and nipa, or husks of rice. This material is moulded into shingles for the roof, and slabs for the walls, the slabs being two by six feet in surface area and half an inch thick, and weighing about six pounds per square foot. The model houses contain five rooms, with a porch, and cost $250 each, which is about the same as for those of nipa construction, making allowance for the frequent repairs which the latter require. It is said that the new-style houses will last twenty-five years, while nipa houses generally last only ten years. The new houses are said to be far more sanitary than nipa houses, which harbour rats and insects in abundance.

At the annual election of the National Academy of Design, held in New York on April 26, Herbert Adams, the sculptor, was elected president to succeed J. Alden Weir, who was elected last year and who refused to serve again. The other officers, who were re-elected, are: Vice-president, Howard Russell Butler; corresponding secretary, Harry W. Watrous; recording secretary, C. C. Curran; and treasurer, Francis C. Jones. The newly elected Academicians are Charles Rosen, De Witt Parshall and Ernest Lawson, painters; James E. Fraser and Paul Bartlett, sculptors; and Henry Bacon, architect. Mr. Adams is the second sculptor elected as president of the National Academy. The late J. Q. A. Ward was also at one time president.

The Liverpool House Builders' Association met last Friday evening, and adopted a draft report asked for by Lord Rhondda giving their views on the national housing problem. In Liverpool the members undertook to erect 9,000 houses in three years after the war, and suggested that certain land and financial facilities should be given. They pointed out that high rents could not be paid by the Liverpool working classes, who had to incur tramway fares in going to and from their employment.

In pursuance of the powers conferred, the Minister of Munitions orders that the war material to which Regulation 30a applies shall include war material of the following classes and descriptions, namely:—All machinery driven by power and suitable for use in cutting, working, or operating on wood, including sawing machines of all descriptions, general joiners, mortise, tenon and boring machines, lathes and rounding machines, box and cask-making machines and all machines accessory thereto, scraping and sandpapering machines, wheelwright machinery, firewood-making and bundling machinery, wood, wool fibre and pulp machinery, saw-sharpening and setting machines, saw stretchers and brazing apparatus, and all machines for grinding, planing or moulding irons. All applications for a permit to purchase or enter into negotiations for the purchase of the war material referred to should be made to the Executive Officers of the Area Clearing House Boards, whose addresses may be obtained upon application to

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"The Director, Central Clearing House, Ministry of Munitions, Charing Cross Buildings, S.W.2." All applications for a permit to sell or enter into negotiations for the sale of the war material referred to in the above Order should be made to "The Director" of Wood Working Machinery, Charing Cross Buildings, S.W.2.

The American Museum of Natural History contains the largest piece of jade (nephrite) ever found *in situ* and the largest ever polished, measuring seven feet long by two and a half wide, and weighing 4,718 lbs. In the last number of the American Museum "Journal," Dr. George F. Kunz tells how he found this piece of jade some years ago in a quarry at Jördansmuhl, Silesia. Its discovery was especially interesting from an ethnological point of view, because certain authorities had maintained that all the jade objects found in Europe were of Asiatic origin. The finding of this great mass of nephrite, sufficient in itself to furnish material for all jade objects and ornaments hitherto found in Europe, proved that it was not necessary to assume that prehistoric jade objects were brought from the Orient in connection with race migrations.

With a view to removing misconceptions which have recently arisen in various parts of the country, the Minister of Munitions has issued a notice directing attention to the fact that (1) no building or construction work costing over £500, or involving the use of constructional steel, can be undertaken without a licence from the Ministry; and (2) that such a licence is as necessary for work involved in the restoration of property destroyed or damaged by fire or aircraft as for work undertaken in other circumstances.

CHIPS.

Some 7,000 building trade operatives in Birmingham who applied for an additional war bonus of 3d. an hour have been informed that the employers cannot grant the request.

The death is announced on May 28, at 13, Lincoln's Inn Fields, of Mr. Walter Lewis Spiers, A.R.I.B.A., F.S.A., curator of the Sir John Soane Museum, aged sixty-eight. There was a memorial service at St. Andrew's Church, Wells Street, W., last Thursday, and the funeral was solemnised at Brookwood Cemetery.

Second-Lieutenant William Shand Kydd, R.F.A., killed on May 16, was the eldest son of Mr. and Mrs. Shand Kydd, of Highgate, and was twenty-three years of age. He joined the O.T.C. in 1915, and was sent to Exeter, where he completed his training as an officer and was gazetted on July 8, leaving England immediately for the front.

The thanks of the Senate of the University of London have been accorded to the Society of Antiquaries for the renewal for a further period of five years of the Franks studentship founded by them in memory of Sir A. Wollaston Franks, K.C.B., for the promotion of the study of the archæology of the British Isles in its comparative aspects.

Principal Maclachan, the Moderator, formally opened on the 29th ult. as a church house and club the historic house at 52, Queen Street, Edinburgh, in which Sir J. Y. Simpson conducted the experiments by which he discovered the anæsthetic use of chloroform, and which has been given by the family of the late Sir Alexander Simpson to the United Free Church. The house will be used as a temporary residence of members of the club, missionaries on furlough, for Church sisters, and place of meeting for conferences and for social intercourse.

The Catholics of the Church of the Sacred Heart, Eden Grove, Holloway, have placed a memorial in the church to those who have fallen in the war, which was unveiled on Sunday at 7 p.m. The memorial is of oak with richly moulded frame, having carved patterns at intervals, with the Tudor rose in the four corners. The centre part at the top is raised and gives the outline for a vesica-shaped panel in which is carved the Sacred Heart, with lilies filling in the spandrels—all in high relief. Four panels are formed at the angles, and in these are carved various emblems of the Passion of Our Lord. The dedicatory inscription carved in raised lettering at the top of the panel is the text: "Greater love than this no man hath, that a man lay down his life for his friends."

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

*****Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.**

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A notice posted on the gate leading to a local allotment reads:—"Land of Hope and Glory." And some pessimist, or perhaps a small boy with a perverted sense of humour, wrote underneath, "More hope than glory!"

At a preliminary meeting of the Valuation and Inventory Clerks' Federation, held at the Audley Hotel, Mount Street, W., it was unanimously agreed that the fees for making and checking inventories in town and country be raised to 15s. 9d. per day and 1½ guineas per day for making catalogues and valuations. A number of the principal agents have already agreed to the increased fees.

Mr. William Harpur, for thirty-four years borough engineer of Cardiff, and the oldest official of the City Corporation, whose service he entered forty-one years ago, died on Whit Sunday, aged sixty-five years. He was a son of Mr. Samuel Harpur, at one time borough surveyor of Derby, and afterwards of Merthyr. The late Mr. Harpur was in 1899 President of the Association of Municipal and County Surveyors.

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AND ENGINEERING JOURNAL.

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The Problem of the Small Dwelling and its Solution. Two sheets of typical examples and application of the patented plan. Mr. Robert Thomson, Architect.

Currente Calamo.

The new Institute of Scottish Architects had a good send-off at its first annual convention last Friday at Edinburgh. Sir John Macdonald's plea for the more frequent use of Scottish forms in Scottish building was well and humorously sustained, especially by his reminiscences of buildings in Stettin. Mr. John Watson, of Glasgow, well summarised the objects of the Institute, the chief aim of which is to be to help and stimulate desire for good architecture by the general public. That was also excellently emphasised by Sir Rowand Anderson, whose remarks on housing, and the necessity for ceasing to pile family over family on the top of one another in the huge tenement-houses common in Scotland, and the substitution for such of self-contained dwellings without sunk basements and long high stairs, were as timely as pertinent. Sir Rowand's confidence in the final supremacy of reason over dogma is encouraging. We wish it was more generally shared, for in architecture, as in all other arts, till the creative faculties of man are freed from the stifling traditions of worn-out shibboleths, the transient and not seldom absurd fashions of the day will still prevail, and the crazy quest of picturesqueness will exhaust the feeble energies of those who pursue it. We wish the new Institute all success, and will do all in our power to second its efforts.

The Surveyors' Institution is to be very heartily congratulated on the excellent president it has secured in succession to its fortunate choice of Mr. Stewart last year in the person of Mr. Arthur Lyon Ryde, of 49 and 50, Parliament Street, and all will earnestly hope that his present anxieties with regard to the fate of his younger son, who was reported wounded and missing on May 8, be speedily dissipated. Similar anxieties have afflicted a great number of surveyors, since 2,400 members of the Institution have joined the Forces, of whom over 150 have fallen upon the field of honour. No profession has, indeed, more nobly fulfilled its patriotic duty in the greatest crisis of our history. Mr. Arthur Lyon Ryde was born in 1854. He is the second son of the late Mr. Edward Ryde, who was one of the founders of the Institution and occupied the presidential chair for three years in succession, viz., 1880, 1881, and 1882, to his own great credit and to the great advantage of the Institution. Mr. Arthur Ryde entered his father's office, becoming a partner in 1879. In 1887 he was appointed Valuer to the Receiver for the Metropolitan Police District, in which capacity he has since bought the freehold of over 150 sites in the Metropolitan Police area. Mr. Ryde holds retainers for the South-Eastern and Chatham Railway and the North-Eastern Railway, and has on many occasions given evidence for those companies in compensation cases. Although railway compensation cases are not so frequent as they once were, Mr. Ryde's experience in this class of work is often made use of in the isolated cases which crop up from time to time for corporations and other public bodies. He has also sat as arbitrator on many occasions in these cases. As a witness in rating appeals, Mr. Ryde has given evidence in almost every rating appeal of any consequence which has been heard in the past twenty years, and he has valued nearly all the larger gasworks and waterworks in London and the South of England with a view to advising on their rateable value. Mr. Ryde married in 1879 a daughter of the late Bishop Titcombe, who was formerly Vicar of Woking and left to become the first Bishop of Rangoon. He has two sons, both of whom were in partnership with him when war broke out. The elder now holds a commission in the Army Service Corps, and the younger was reported "wounded and missing" on May 8. It is still hoped that Mr. J. T. Ryde (who was chairman of the Junior Committee of the Surveyors' Institution from June, 1912, to May, 1913) is alive, although, if he survives, he must be a prisoner in the hands of the Germans.

The Secretary of the Defence of the Realm Losses Commission has sent to the newspapers some explanations of the action of his department in commandeering houses for military occupation. The Commission, the Secretary says, is restricted to awarding "the exact amount of direct loss and damage," and in this case the applicants for compensation failed to "establish any possibility of letting or selling the house in question during the period of military occupation." So the commissioners awarded only "an indemnity against rates, tenants and taxes, and the cost of insuring the premises." The Secretary says that the question of dilapidations was expressly reserved, and that in this respect complainants are "entirely safeguarded against any possibility of loss." We really should like to know how! If that means that at the close of the occupation the fullest and most comprehensive compensation will be awarded, all we can say is the past history of the Commission warrants no such expectation. But, if so, surely there ought to be some consideration for an enforced occupation extending over a long period? For a few months, or even a year, large houses may remain unlet, but the Government tenancy is running into years, and meanwhile the owner is to be mulcted because he cannot prove what it is manifestly impossible for him to prove!

M. Pierre Paris has announced to the French Academy of Inscriptions the discovery of what may prove to be a second Pompeii, buried under the sands of Morocco. In carrying out excavations in the region of Bolonia, on the sea coast, M. Paris first came across an ancient factory, believed to have been established for the salting of fish, and more particularly perhaps of the tunny fish which abounds in those waters. This factory was indisputably of Roman origin, as proved by the style of the columns and marks upon them, careful photographs of which have been taken. Further search revealed on a vast terrace dominating the sea a big house obviously contemporaneous with the factory. The atrium of the dwelling has been completely cleared, and is surrounded by vestibules and chambers, a sketch of the plan of which had been executed. M. Paris says that this is merely a beginning, and that he is convinced a whole town in an exceptional state of preservation can be unearthed.

"Berger's Mercury" is the new title of the excellent monthly magazine issued by Messrs. Lewis Berger and Sons, Limited, of Homerton, since September, 1914, when it was known as "Good Busi-

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ness News." We all wanted encouragement then and solid proof that good business *could* still be done, when it pleased the powers that be to permit it. No firm has given such proofs in greater abundance than the premier colour, paint, and varnish makers of the world, who since 1760 have ever been in the van of progress in all that concerns their arts. For the rest, "Berger's Mercury" is really better worth reading than half the magazines and weeklies of the day. There is not a dull line in it from cover to cover. The aims and scope of its conductors are not vaunted in the old E. Moses and Son style, now again in favour with some advertisers, which certainly provokes a smile —of a sort, but little more. Lastly, the May issue should be bought and treasured by all who honour the brave dead, for it contains an illustration of the unostentatious but well designed Roll of Honour Board erected in the headquarters of the Berger Optimists' Club at Homerton to the memory of the Berger men who have fallen since the war commenced. Other firms would do well to encourage similar records. They are better thus placed and will be likely to be longer preserved than at odd street corners and amid slummy surroundings.

The employment of young girls as flag sellers was heartily condemned last Friday by the Head Mistresses' Conference at Hammersmith. The member who introduced the matter lives at Chatham, and said she had on innumerable occasions seen charming young girls, fashionably dressed, waiting outside barracks and camps, speaking to strange young officers, and striking up acquaintances which might lead anywhere. The difficulty was that the modest girl who undertook the task of flag selling from most patriotic motives soon found that to get good custom she must exercise her powers of fascination, and the more fascinating she made herself the more money she earned. The conference agreed that other districts should adopt such regulations regarding the age of street collectors as London has found essential, but Miss Faithfull, of Cheltenham, thought it would have been better to prohibit women taking any part in these street collections. We should hardly go so far as that, but it is useless to ignore the fact that the multiplication of flag days and the behaviour of some of the sellers is prejudicing quite laudable objects. The idea is gaining ground that flag-making and flag-selling are becoming trades, and that those who produce and those who sell might be more usefully employed.

In a conspicuous position in the centre of Whitby Cemetery there has just been erected a memorial to the victims of the wreck of the hospital ship "Rohilla," which stranded off Whitby on October 30, 1914, when ninety-one officers and men were drowned.

Sir Richard Biddulph Martin, Bart., head of the London banking house of Martins (Limited), M.P. for Tewkesbury 1880-85, and for Mid-Worcester as a Liberal Unionist from 1892 to 1906, who died on August 23 last, aged 78, has left estate of the gross value of £335,509, with net personalty £198,178. Among his bequests were £1,000 for repairs to the fabric of the Church of St. Faith, Overbury.

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION.—IV.

By ROBERT THOMSON.

(WITH ILLUSTRATIONS.)

Since the plans in the Government's two extensive collections, without a single exception, show dwellings of the combined kitchen-living room type, the nation's model plans are thus deliberately endowed with the very grave defects I commented upon in last week's issue; and in addition thereto they have many other serious defects of their own. For example, on acount of the lack of proper living-room accommodation the occupants of the dwellings built to these plans are forced to herd together in a very small kitchen, so that, except for the location of the building, they are not one whit better off than the occupants of the single-apartment type of slum dwelling; and, like the poorest of the poor, they have no conveniences.

Their planning is of the most rudimentary character. The living-room, for instance, in the great majority of them, opens directly out of the scullery, which in such dwellings is usually the wash-house also. By the way, although it is called the wash-house, beyond the copper, there are no facilities whatever provided either for washing clothes or for drying them when washed.

There is no bathroom, but the committee explicitly state that "If provided, the bath must be in the scullery or wash-house." Here also is the larder and the sink at which all the domestic utensils are washed, and at which much of the food has to be treated before cooking, is the only place available for the family's ablutions. In practically all the plans both living room and scullery are thoroughfares, and the draughts of cold air which, passing underneath the doors, cut across the floor of these apartments must be particularly dangerous to those infants who are at the "floor" stage of their existence.

In many cases there is no entrance lobby. In such houses the stairs, which are all very steep and narrow, rise directly out of the kitchen-living-room, and, of course, the staircase thus acts as a funnel which conducts the hottest of the polluted air from this apartment direct to the bedrooms.

In others of these designs, including the Advisory Committee's plan No. 8, which they say "provides the most convenient of cottages," the arrangement of the stairs in the two centre houses is, according to the committee, so defective that "the staircases must be lit and ventilated by small dormer windows high up in the roof controlled by cords, which are not so convenient as ordinary windows, or so likely to be opened."

There is neither pantry nor storage space provided in any of their plans, and in many, including their "most convenient of cottages," there is not even the semblance of a cupboard.

In their four-in-a-block type of cottages there is much money wasted both on plumber and drainage work by the scattered arrangement of the water-using appliances, and there is much more squandered on the relatively costly passage-way which the committee provide, "where ready access from the road to the back doors of the centre houses is important."

The Advisory Committee, referring to the drawback of the scullery wash-house arrangement, state that "The strong objections found in some localities to the use of the scullery as a wash-house is principally due to the steam which fills the house." "This objection," they state, "can be removed to some extent by the use of a steam-consuming copper, and where it is of the first importance to keep down expense, the use of the scullery for washing undoubtedly allows of the greatest economy of space." The utter disregard of the most ordinary health requirements which this statement reveals is deplorable. Has it ever occurred to the committee that the presence of "the steam which fills the house" affords conclusive proof that the occupants of such dwellings receive a substantial volume of their air supply through the scullery-wash-house, which is certainly not a salubrious channel?

That the combined kitchen-living-room arrangement has drawbacks the committee themselves admit by recommending that there be a fireplace provided in the scullery, stating as their reason that "this is a great boon to the household in hot weather, when a fire in the living-room causes discomfort." That being so, why do they design houses which force the people to live in squalor and discomfort in a kitchen in which a fire is essential, when they apparently know that it is a positive comfort to be without a fire in the living-room for at least six months of the year?

Besides the foregoing and many other defects with which these official plans are so plentifully endowed, the sizes of their apartments are very small and their standard ceiling height only 8 ft. Overcrowding and overheating are therefore inevitable.

In this connection the Advisory Committee, after stating that "The necessity of lodging out is usually spoken of as a disadvantage, and no doubt existing conditions lead to its being carried to an unreasonable extent," make the Napoleonic suggestion that "it seems quite reasonable and unobjectionable to rely on some degree of lodging out as one means by which the available housing space can be used to the fullest advantage and overcrowding prevented."

As very few people appear to have any sort of idea as to how very small the dwellings erected to the Government's model plans actually are, it may be mentioned that in a cottage designed to accommodate a family of nine, even when the size of every room is strictly in conformity with the Advisory Committee's "Desirable" standard, the total air contents in the four habitable apartments of which the kitchen is one, could be easily contained in a single chamber measuring less than 16 ft. each way. Moreover, the air contents of the apartment which has to serve the family of nine as kitchen, living-room, laundry, nursery, and drying-room, could be easily contained in a box which measures only 11 ft. 3 ins. each way.

But the gravest defect of all—and it is a very grave defect indeed—is the very serious shortage of air space in the two bedrooms designed for children. The smaller of these meets the "Desirable" official standard when its air contents are equal to those of a box which measures only 8 ft. each way, and, deplorable to state, this room, like the box, has neither chimney flue nor other equivalent means of providing adequate ventilation. Although each of the two other bedrooms has a fireplace, in very many of these officially-planned model dwellings it would be necessary to remove the bed from the room before a fire could be with safety kindled in the fire-grate of these bedrooms. Can anyone for a moment contend that it is not seriously detrimental to the health and stamina of children that by day they should be brought up in the

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often overheated and nearly always stuffy atmosphere of these small kitchens, and at night be forced to occupy an unventilated box-like bedroom which is admittedly very seriously deficient in air space? No prison authority would dare to risk the health of more than one convict in such an apartment as the living-room shown in the nation's model plans, because of its insufficiency of air space, and for the same good reason no one would be permitted to keep more than one cow in a byre of similar size. The air space in the case of both cow and criminal is fixed in accordance with their vital requirements, but that of cottagers and their families is determined on a financial basis to suit the limited planning capacity of insufficiently skilled experts. It is probably not generally known either that the health of convicts has been protected by Act of Parliament since the year 1778, or that more than seventy years ago a report on Pentonville Prison, which was presented to both Houses of Parliament by command of her Majesty Queen Victoria, states that "After much careful consideration," it was decided that each convict must have 820 cubic ft. of air space, and the report further states that these convicts' cells are so well ventilated that the air contents of each cell is renewed between two-and three times every hour. If at that time similar provision had been made for the housing of the people, it is safe to assume that tuberculosis would long ere this have ceased to be the plague that it now is.

Even the committee themselves, by drawing attention to the "very small sizes" of the apartments called for in their report, admit two of the vital defects in their plans. Instead, however, of making any attempt to remedy these vital defects they excuse them on the ground that "economy is so essential that space must be sacrificed to secure it." At the same time they seem to suggest that these plans are the most perfect plans that could possibly be devised, since they actually recommend that wherever existing building regulations interfere with their execution the regulations should be amended by "waiving all but the minimum requirements for health and sanitation."

The result of giving effect to these wholly unwarranted and unnecessary interferences with the building regulations would be to cover the country with thousands of wretched dwellings, which would perpetuate the evils of past generations and add not one iota to the comfort and convenience of the occupants. If the health of the nation is to be adequately safeguarded it is imperative that the combined kitchen-living-room type of dwelling be abolished and that the people be provided with perfectly planned substantially constructed dwellings, having adequate air and floor space and efficient ventilation in all their apartments, so that the vigour and stamina of the children can be properly developed and consumption and the other vile products of defective housing effectively combated.

Consequently, instead of relaxing any single one, either of the constructional requirements or health regulations, the hands of the authorities ought rather to be strengthened in both directions. The standards of both ought to be raised sufficiently to exclude such houses as those shown in the committee's series of model plans.

That this can be accomplished without entailing any hardship to the builder, without extra cost, but with enormous advantage to the occupants will appear later. It is lamentable that the committee should have seen fit to make such retrograde recommendations, but the ill-designed plans which they put forward for adoption as the best possible left them no alternative. If the object of the committees had been to make a collection of plans showing examples of all the defects that exist or could be conceived they could not have performed their task more successfully.

The two collections of cottage designs published by the Government are valuable in that they provide an authoritative record which shows the highest standard to which the official planning of cottage dwellings had attained at the date of the latest issue to the public in the year 1915. The designs of small dwellings published since then show no improvement. On the contrary, they show that the defects of the nation's model plans have been faithfully perpetuated.

From the accompanying elementary plans on Sheet VI. it will be seen that each shows a dwelling consisting of five apartments, with working and office accommodation and a roomy entrance lobby, which is well protected by a large semi-enclosed entrance porch. In view of the general muddle-up of the working and living accommodation provided for in the plans of the Government's model types of dwellings, it may be well to point out that of the five apartments shown in the plans on Sheet VI. herewith, four are exclusively habitable and one exclusively working and that, as is the case in all good dwellings, the habitable is carefully isolated from the working and office accommodation.

In order that thoroughfares, with their attendant through draughts and the discomforts and even dangers which these entail, may be avoided, the dwelling has been so planned that only one outer doorway is required.

The working and office accommodation comprises a comfortable apartment for the housewife, a roomy bathroom, a large pantry, two cupboards, a fuel store, and, opening out of the lobby in close proximity to both the living room and the working apartment, a large larder and in addition to the foregoing there is, in the perfected plans, provision for about 200 cubic feet of storage space having a floor area of over 60 square feet.

Since the efficient planning and equipment of the working apartment is of primary importance to the housewife, the larger scale drawings on Sheet VII. have been prepared in order to show its arrangement and equipment in some detail.

It may be explained that this apartment is fully fitted and equipped for all kitchen and other working purposes, including the washing, drying, and airing of clothes, and that it is so planned and the fittings and equipment so disposed as to enable the housewife to cut down the work to the irreducible minimum.

One of the novel fittings by means of which this much-to-be-desired end can alone be attained is shown for the first time in the combined sink and washtub seen in Figs. 42, 43, and 44. This combined arrangement of tub and sink possesses many important advantages over the ordinary type of sink and washtub such as are seen in plan Fig. 46, and still more over those in the proposed municipal wash-house and bathrooms which are provided for in connection with plan Fig. 45, since it enables the washing to be done in comfort at home at any time suitable to the housewife instead of in the public wash-house at such times only as suits the convenience of her neighbours, who are compelled to conform to such arrangements as the authorities may determine. Constructed in glazed fireclay, the mouth of the tub, as will be seen from Fig. 43, is covered by a portable wooden lid, which, when in position, forms a table-top in front of the sink. The tub is at all times available for the soaking of clothes, and the lid being instantly removable and as quickly replacable, washing can be either begun or suspended at a moment's notice; and there is never at any time the slightest interference with the use of the sink. The combined arrangement thus not only offers increased facilities for the washing of clothes, but its cover provides many conveniences for the housewife in the use of the sink.

Laundry poles, as shown in Fig. 44, are fitted to the ceiling of this apartment, which is sufficiently high to enable its upper portion to be utilised for the drying and airing of clothes without these interfering with the ordinary work of the kitchen going on below. The advantages which this arrangement secures, by keeping the moisture out of the living room, are, from the health point of view, of vital importance to every occupant of the dwelling.

As will be seen from Figs. 42 and 44, the dresser extends right across the end of the apartment and offers unusually ample accommodation. There is also shown as equipment a cooking stove and copper, and over these a shelf would be fitted so as to provide for the drying of footwear. There is also room for a mangle. In front of the table seen on each side of the tub hinged tables could be arranged. These are shown in a later drawing. What more could even the most exacting housewife require for the efficient conduct of her work than the provisions hereinbefore set forth?

The most important consideration of all is that, as shown by plans Figs. 21 and 23, these can be provided in dwellings with better habitable accommodation at less cost than the existing primitive slum-like type of dwelling with which the nominees of Mr. Runciman would provide the people.

From the religious standpoint cleanliness may be next to Godliness, but from the health point of view, with which alone we are at present concerned, clean sinners are better than dirty saints. As there are at present infinitely more dirty sinners than clean saints, and as it is essential for the adequate safeguarding of The Public Health that both varieties must be, at least, bodily clean, every provision has been made in the wing for facilitating the cleansing process. To this end the bathroom is shown, with a lavatory basin as well as the bath, and it will be seen that the business ends of the sink, tub, basin, and bath are so closely grouped as to leave no room for either waste or further economy.

The high economic value which even the elementary type of plans shown on Sheets IV., V., and VI. can offer at a cost which is substantially less than that of any existing type of cottage having the same amount of houseroom and which is similarly equipped, fitted, and finished is secured partly by means of the truncated and bifurcated triangular wing portion shown on Sheet VII. This novel form of wing, which is borrowed from the perfected dwelling, of which it is one of the distinctive features, possesses properties which are both valuable and unique. For example, it enables the office accommodation and other conveniences to be provided exactly where they are required, and the economy which it secures both directly and indirectly is remarkable and unapproachable by any dwelling of existing type.

Among its many economical contributions are the two semi-enclosed entrance

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porches, which are partly formed by the inwardly converging walls of the two bifurcations. These porches measure 11 ft. between the apices of the bifurcations, and as each of the two encloside side walls measures 5 ft. 6 in. in length, each porch is thus sufficiently roomy either to seat a large family party or to serve by night as a sleeping porch for the domiciliary treatment of consumptives.

By providing direct external communication between the front and back gardens without any mixing up of tenants in the use of paths, it solves, without extra outlay, the problem for which the relatively costly passageway, seen in the Advisory Committee's model plan No. 6, has been provided. This official plan, however, while giving direct access, involves common use and loss of privacy, which such makeshifts usually entail.

By enabling the water-using appliances of each pair of dwellings to be served by the one stack of pipes and those of four dwellings to be so conveniently grouped that all four can be served by the one main water supply pipe, the one main drain, and the one set of main drainage connections, it provides for the maximum economy which is possible of attainment being secured in the plumber and drainage work.

It will be seen from Fig. 48 that the stair, besides serving its proper function, provides a roof to the coal stores of both dwellings, and from any of the plans on Sheet VI. it will be seen that it is so disposed as to screen the back yards from the approach to the dwellings. With an ivy or other evergreen-covered trellis alongside the stairs, the yards could be completely hidden.

As compared with the usual type of wing, the saving in materials, the gain in space, the economy, and other advantages which it offers are all substantial. For example, if each of two ground floor dwellings having 15½-in. cavity walls were equipped, the one with a square wing, the other with a triangular one, each wing having 9-in. solid walls, ceilings 10 ft. 3 in. high, and an area of 100 sq. ft. measured over the walls beyond the line of the main building. The triangular wing, besides providing the large entrance porch, with 5 ft. 6 in. side walls, would give internally about 188 cubic ft. more air space than the square one, and the value of this gain in space, when priced as houseroom at the officially based rate of 15d. per cubic foot, works out at £11 15s.

The saving in walling is also important. The dwelling with the triangular wing actually requires less brickwork than it would without the wing, whereas the dwelling with the square wing would require much more the value of the difference between the two, taken at pre-war rates, amounting to about £7 in favour of the new form of wing for brickwork alone.

In roofing, the square wing would require a separate roof, which would entail much extra cost beyond that of its actual measurement in the cutting to waste of roofing materials and the additional plumber work required. On the other hand, as will be seen from the sections Figs. 47 and 48, the triangular wing is covered by a downward continuation of the spars of the main roof, an arrangement which, since it does not involve cutting to waste, as in the square roof, enables the triangular wing to be covered at the cheapest possible cost.

In the foregoing respects alone the new form of wing offers economic advantages so substantial as to leave even the most economical cottages of existing types hopelessly far behind, and any one trying to evolve a plan with the object of effectively competing with it would simply be wasting valuable time.

From Figs. 39, 40, and 41 it will be seen that the girth of wing walling in each case is 30, 33, and 34 ft. respectively. The length of walling required extra over the gap is, for the square wing, 21 ft. 6 in., and for the triangular wing less than 9 ft. Section Fig. 47 shows by contrast the difference between dwellings having 8 ft. and 10 ft. 3 in. ceilings respectively. The walling of the lower story is for the sake of stability shown 15½ in. thick. It also shows by contrast the difference between what is by courtesy called a stair in small dwellings and that which ought to be given.

Figs. 45 and 46 are given in order to show the direction in which town planners appear to be developing their dwellings. By referring to Fig. 42 it will be seen how wonderfully adaptable the new form of wing is. By merely shifting the doorway of the bathroom from the lobby wall to that of the kitchen it would at once secure the advantages offered by the Dundee plan, whatever these may be. Perhaps the lone female, for whom the particular arrangement of bed-living room and water-closet-kitchen-scullery has been devised, may have tastes we wot not of.

The Mid-Lanark arrangement of w.c. and scullery appears to have been entirely satisfactory to the various deputations, including those from the Glasgow Housing Congress, who have visited these dwellings.

Anyone not aware of the high encomiums passed by these gentlemen would have foolishly supposed that it might prove embarrassing to say, for example, a burly steel-working lodger seeking either to enter or leave the cabinet, since he might require to remove the lady at the sink to allow of this. It might even be embarrassing for some ladies. For others it might be uncomfortable, but these need not be considered, since they can always wear a gas mask during the busy morning hours.

In the plans shown on Sheet IV., whatever extra floorage was available was allocated to the two smaller bedrooms, but in the plans shown on Sheet VI. such extra floorage has been disposed of partly between the living-room and the parents' bedroom.

Of the plans on this sheet, Fig. 36 is specially interesting in that its roofed area of 939 sq. ft. is exactly equal to the average of the prize designs which the Government thought they were fortunate in securing from a weekly pictorial.

The most interesting fact which need be quoted is that the planning of these officially adopted plans is all of the small-fours quality. This is mentioned here in order that anyone interested in these masterpieces may be enabled to follow their dwindling fortunes throughout the succeeding stages of the present educational series.

(To be continued.)

Messrs. Smith and Pearson, Ltd., Dublin, have been given the contract for the first steel building—to be 230 ft. long, and to be used as a foundry—in connection with the new engineering works at Cork

Lieut.-Colonel Sir John Howard, of Brighton, the well-known engineer and philanthropist, a director of the North British Railway Company, the designer and constructor of the Palace Pier, Brighton, who died on April 20, aged 85 years, has left estate of the gross value of £284,424, with net personalty £275,125.

THE INSTITUTE OF SCOTTISH ARCHITECTS.

A plea for the expression of Scottish characteristics in architecture was voiced by Sir J. H. A. Macdonald at a reception last Friday in Edinburgh, held to celebrate the first annual convention of the new Institute of Scottish Architects. It was very much to be lamented, he observed, that in the past we had not tried to make more use of Scottish forms in achitecture. He mentioned the Municipal Buildings in Glasgow, which he considered occupied a position made for Scottish architecture. In that case, he contended, there had been no need to go to Italy for a design. Discussing architecture in Scotland from the point of view of "incongruity and disfigurement," Sir John Macdonald said in his travels he had seen some extraordinary work done by people who called themselves architects. He mentioned some buildings in Stettin, with false pillars and plaster brackets, purporting to support balconies, with the broad end of the bracket at the outside and the narrow end inside. Such a blunder would be inexcusable in a Scottish architect. Architects, he urged, should take care that they had a distinct say in the decoration of any building. It was an incongruity to put up a good building in the wrong place. He wished success to the new Institute, particularly because their centre would be in a beautiful city, which still retained some traces of beauty in spite of all the efforts of the architects.

TO FOSTER NATIONAL ARCHITECTURE.

Mr. John Watson, F.R.I.B.A., Glasgow, one of the vice-presidents, who presided at the reception (which was held in the rooms of the Royal Scottish Society of Arts in George Street), in the absence of the president, Sir John J. Burnet, Glasgow, explained that the objects of the Institute were "to organise and unite in fellowship the architects of Scotland, and to combine their efforts for the general advancement of architecture and for the promotion of the æsthetic, scientific, and practical efficiency of the profession." They desired through the Institute to guide public opinion towards a true appreciation of their aims, and to foster the national architecture of Scotland. Some day, perhaps, a more liberal education in the Universities would arouse interest in the art of architecture. Then they would have from the public a desire for a larger and nobler expression of their art in the cities. The chief desire of the Institute was to help and stimulate such a desire on the part of the public.

Bailie M'Arthy, in the absence of Lord Provost Sir J. Lorne MacLeod, observed that in the Institute the architects of Scotland were now to have a Parliament of their own to deal with Scottish affairs and to express Scottish needs. On behalf of the Lord Provost and in the name of the citizens he had to give the Convention a most hearty welcome to Edinburgh. They hoped that the result of the meetings of the Convention would be to the advancement of architecture and also of architects, in Scotland.

RECENT CREATIONS IN EDINBURGH.

Principal Sir Alfred Ewing, recalling the observation that Edinburgh architecturally suggested the dream of a genius, said, coming back to Edinburgh after many years of absence, he could not help feeling that some recent creations were more of the nature of a nightmare than of a dream. He welcomed the foundation of the Institute all the more because it was going to have amongst its functions an educational function.

The guests were received by Sir R. Rowand Anderson and Lady Anderson. They included Lord Guthrie, Sir John Cowan, Sir James Balfour Paul, Mr. F. Morley Fletcher, Director of the College of Art, Edinburgh; Mr. John R. Finlay, Dr. W. B. Blaikie, Mr. W. D. MacKay, R.S.A.; Mr. E. A. Walton, R.S.A.; Mr. G. Washington Browne, R.S.A.; Mr. J. L. Wingate, R.S.A.; and Mr. W. G. Walker, the secretary.

HOUSES OF THE FUTURE.

Sir Rowand Anderson, addressing a meeting of the Institute earlier in the day, re-

(Continued on page 509.)

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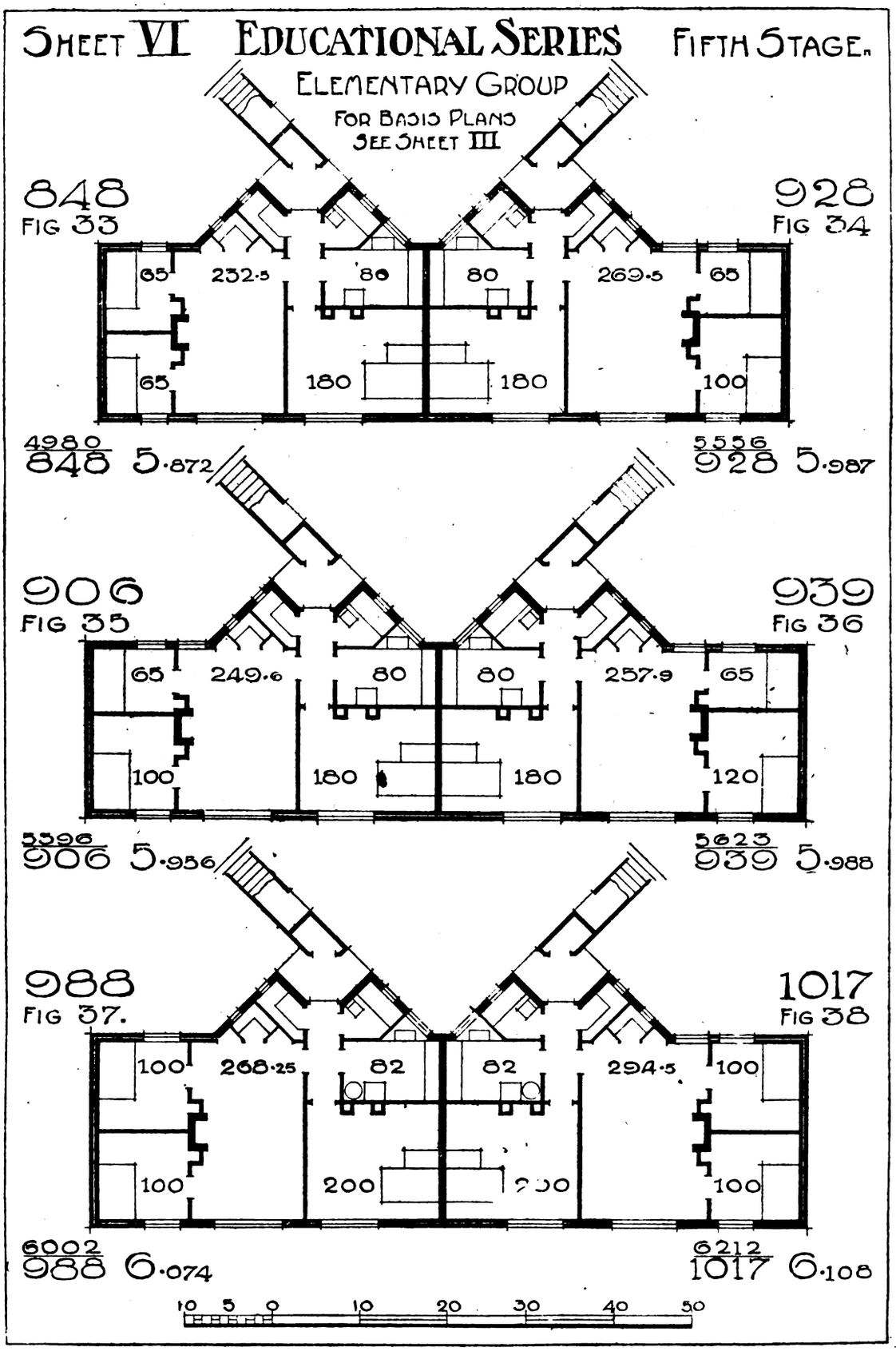

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION: TH

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Joseph Jobling, Photo.]

KING EDWARD VII. SCHOOL OF ART, ARMSTRONG COLLEGE, NEWCASTLE-ON-TYNE.
THE COLLEGE QUADRANGLE AND GATEHOUSE.
Mr. W. H. KNOWLES, F.S.A., F.R.I.B.A., Architect.

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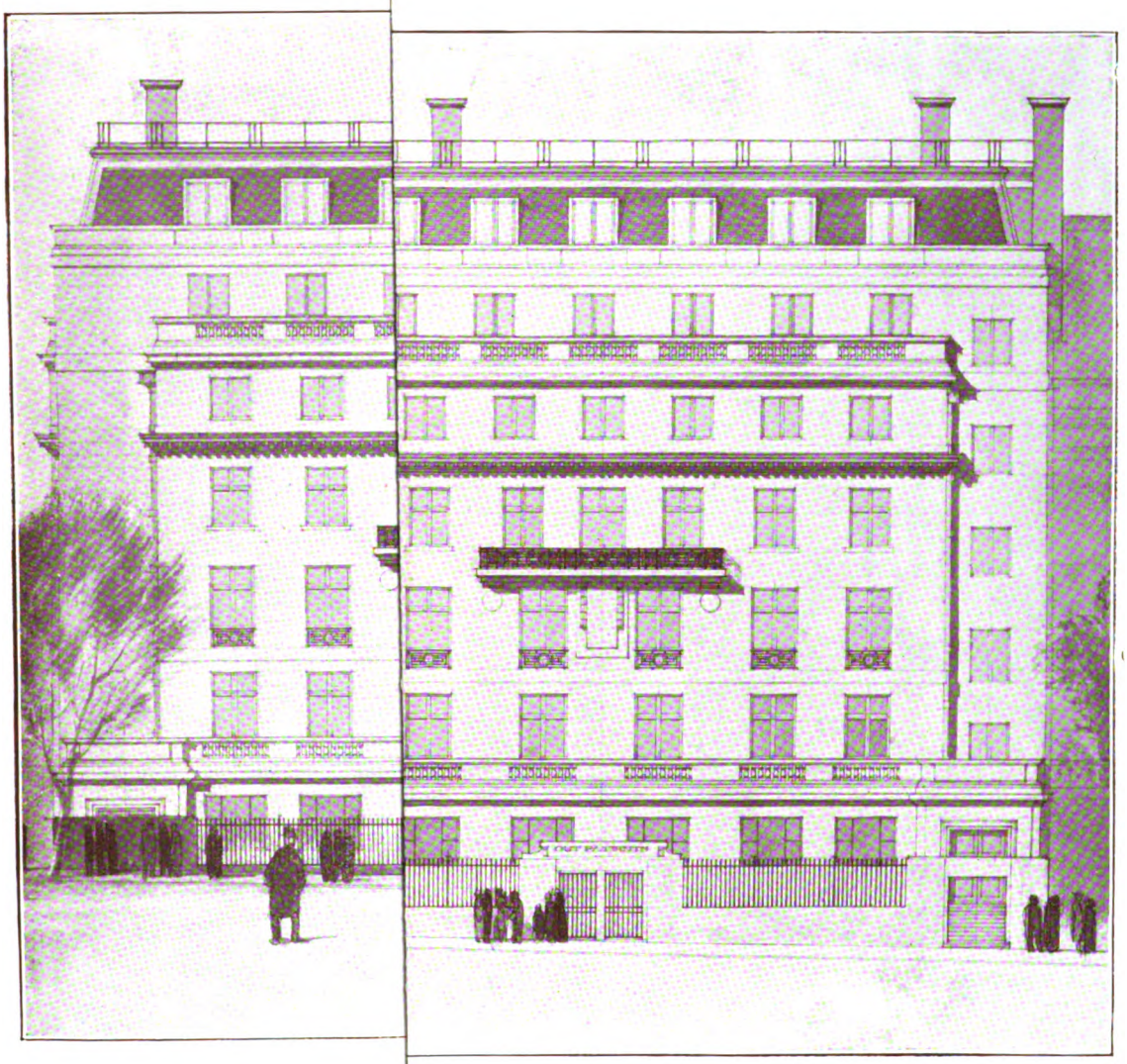

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KING EDWARD VII. SCHOOL OF ART, ARMSTRONG COLLEGE, NEWCASTLE-ON-TYNE.
COLLEGE GATEWAY FROM THE EAST.
Mr. W. H. KNOWLES, F.S.A., F.R.I.B.A., Architect.

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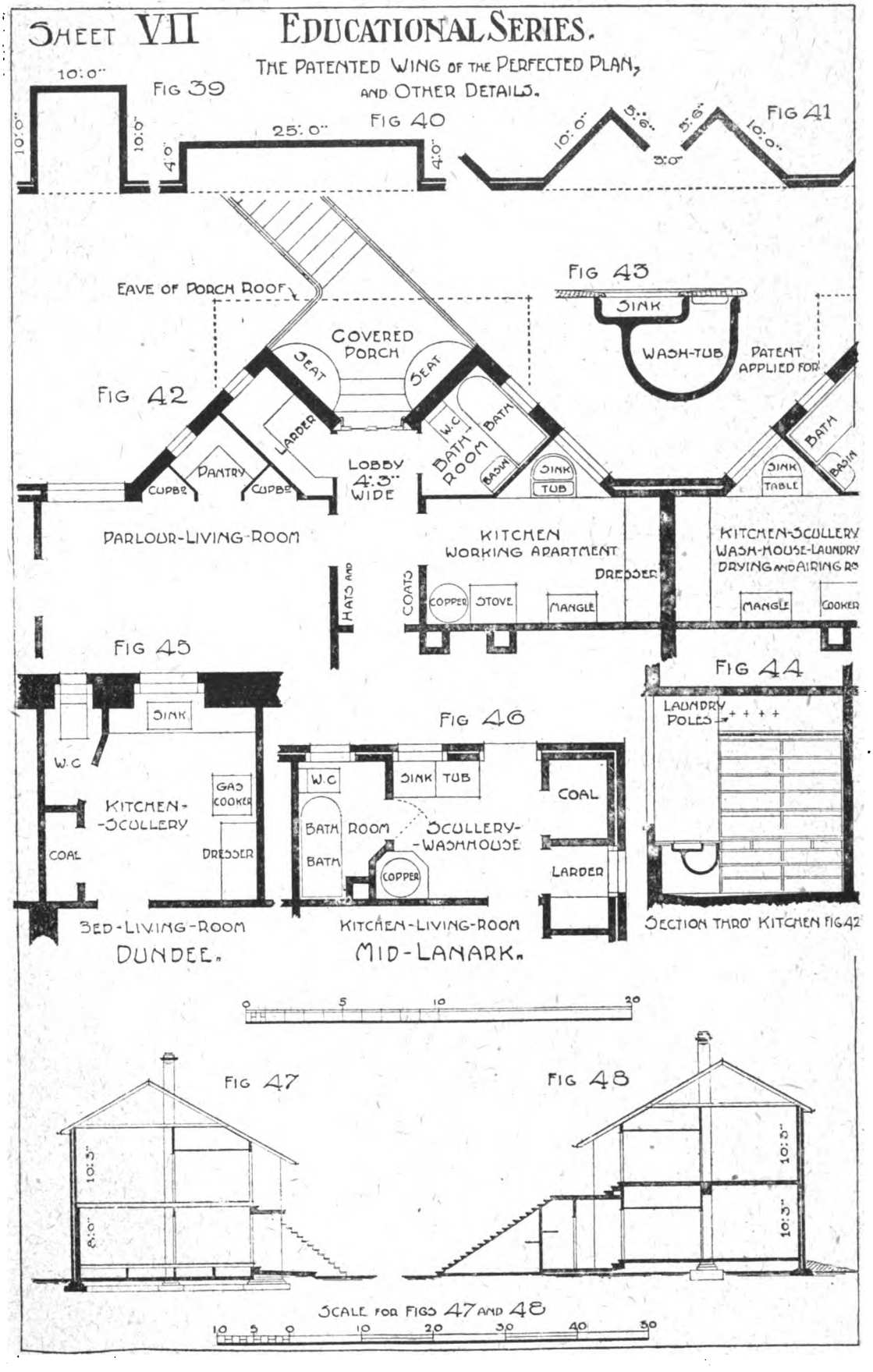

LICATION OF THE PATENTED PLAN.—By Mr. ROBERT THOMSON, Architect

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THE INSTITUTE OF SCOTTISH ARCHITECTS.

(*Continued from page 496.*)

marked that an earlier Architectural Institute, founded in 1850, gave much attention to housing and sanitary questions. The new Institute must do the same, and aim at a higher standard than ever. At the foundation of this question of housing was that of getting cheaper land for building on. Before that difficult question was equitably solved very little could be done. Hitherto they had been compelled to pile families on the top of one another, as many as sixteen being accommodated in layers, and all entering off a common stair. Attempts were being made to alter this for the better. With cheaper land, the building of self-contained houses could also be greatly improved, and sunk floors, sometimes double, could be abolished, and with them the long and high stairs. This would add much to the comfort of those who had to live in such houses.

TRAMMELLING TRADITIONS.

The great and only hope of architecture lay with the public. They must ask for, and insist on getting, structures soundly and sanitarily constructed and adapted to the purposes for which they were erected. Then men able to carry out such buildings in an artistic and truthful manner would, by reason of this determination, be called into existence. Architecture must cease to follow the transient literary and æsthetic fashions of the day. The absurd distinction of fine art from that which was useful or mechanical, and of architecture from building, and all the talk about applied art must give way to that which was produced as in nature, if we were ever to get into a clearer atmosphere of reality than now surrounded us. We must put ourselves in line with the science of the day. Then we might look forward to erecting buildings fitly representing the ideas and wants of the age, with a constant succession of ever-varying expression and beauty, with natural dignity, and not artificial picturesqueness. That time might not be very far away. Ever since the penetration into Europe of the Arabian doctrine of the supremacy of reason over dogma—which many maintained to be one of the chief factors in the renaissance of learning and art—the world of thought had been in a state of transition. The causes that had been ceaselessly at work since then were now gathering great force, and the victory of reason and law seemed now assured. When that took place the great creative intellect of man, untrammelled by worn-out traditions, but utilising all that was good and of universal truth in the past, would have free play, and the world would then see structures greater, grander, and more useful than any that had ever existed.

Our Illustrations.

ST. GEORGE'S HOSPITAL, HYDE PARK CORNER, LONDON, W.

The elevation illustrated, which faces Hyde Park, and the portion proposed to be erected (which is that part to the west of the central feature) will occupy the site of the fine house in Knightsbridge situated between the hospital and Hyde Park Corner Tube Station and the property of the hospital. The building will contain on the ground floor the casualty department and in the basement the out-patient department, consisting of waiting hall for 250 patients, and arranged round this the medical, surgical, obstetrical, ophthalmological, aural, and dental consulting rooms, operating theatre, also the dispensing and almoner's department. On the first and second floors will be the medical officers' quarters, on the four upper floors will be accommodation for over 100 nurses. The drawing here reproduced is now at the Royal Academy. The building will be faced with Portland stone, and it is hoped to commence operations directly after the war. Messrs. H. Percy Adams, F.R.I.B.A., and C. H. Holden, A.R.I.B.A., are the architects.

KING EDWARD VII. SCHOOL OF ART, ARMSTRONG COLLEGE, NEWCASTLE-ON-TYNE.

In 1837 was established "The Fine Art Society of Newcastle for the Promotion of the Fine Arts in their Higher Departments, and in their Application to Manufactures." It received considerable support from the local gentry as well as from others, such as T. M. Richardson and J. W. Carmichael, artists; Thomas Bewick, the engraver, and John Dobson and Benjamin Green, architects. The committee kept in close touch with the School of Design at Somerset House, who assisted, and in 1843 appointed William Bell Scott as master.

Afterwards, under the control of South Kensington, the Newcastle School of Art continued to flourish, and became associated with Armstrong College, of the University of Durham.

In 1912 a fresh impetus was given to the teaching and study of the fine arts throughout the North of England by the munificence of Dr .J. B. Simpson, which enabled new buildings to be erected, and by gracious permission to be named after King Edward VII. At the same time the Art School was raised to the level of a department, and a diploma of Fine Art in the University established

The position of the school building is at the north-east angle of the college site on land lying between the Science buildings and Eldon Street. Part of the accommodation is provided in the upper floors of a gateway which spans the College Road. The entrance is within the angle of the two wings, located on the right after passing through the College gateway. The accommodation is arranged chiefly on three floors, the lowest devoted to the crafts, the middle or ground floor to general and administrative apartments, and the upper to studios for life and antique classes.

The elevations are carried out in brick with stone dressings, the roof being tiled. The floors generally are of fireproof construction, the heating by hot water on a patent system. The ventilation by fresh air inlets in the external walls, the foul air being extracted by means of flues, connected with a central turret, fitted with an electric fan.

The whole of the works were carried out from the designs of W. H. Knowles, F.S.A. (Knowles, Oliver, and Leeson), Newcastle-upon-Tyne. The general contractor was Mr. A. Pringle, of Gateshead, and the clerk of works Mr. C. J. Rawling.

The two views given among our illustrations to-day belong to three on exhibition at the Royal Academy. We shall shortly give the plans of both floors, with photographs illustrating the screen to the staircase and the Library fireplace, and also the third general view of the buildings.

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION.

Continuing Mr. Robert Thomson's descriptive articles, accompanied by explanatory types of planning, we to-day give another pair of sheets with full particulars of the suggestive ideas embodied in his examples Nos. 6 and 7, which include his patented plan applied to the entrances and adjacent accommodation.

Mr. Charles George Scott Acock, surveyor of the southern division of Devonshire, died on the 5th inst. at Newton Abbot, aged 70.

The death occurred on Monday, at the age of 75, of Sir Joseph Bithell Leach, auctioneer and estate agent, of St. Helens and Liverpool, who was knighted last week.

The American Society of Civil Engineers has abandoned its forty-ninth annual conference, which was to have been held from June 12 to 15, owing to "the present condition of war, which involves the absence of many members of the society in the service of their country."

Mr. Andrew Francis Stewart Bryden, of 43, Dunward Avenue, Shawlands, Glasgow, architect, formerly of 147, Bath Street, Glasgow, and latterly of 278, St. Vincent Street, Glasgow, of Messrs. R. A. Bryden and Robertson, architects, left personal estate in the United Kingdom valued at £112,574.

"COAL CONCRETED FROM ASHES OR DUSTS."

BY R. GOULBURN LOVELL, A.R.I.B.A., M.S.A.

When in France, last year, lecturing to the troops, I found the dearth of fuel so pronounced that, at one of the largest training camps, there was a constant peril of the supplies entirely failing. The suffering was most acute last winter. As you are aware, our frugal neighbours utilise their coal dust by compressing it into briquets. The plant is costly, considerable pressure is required, and, although the resultant fuel incandesces fairly well, it does not flare up nor does it coke.

At the beginning of the year, during the very hard weather, the lack of supplies from England made it necessary to use up the coke dust, slack or débris of any calorific value. One's efforts were directed to finding some matrix that might bind the dust and ashes to form a fuel quickly. A fuel that would not disintegrate in the fire or during transportation. It can be assumed that the supply of fuel to-day is as important as the supply of bread. Yet millions of gallons of petrol and tons of valuable chemicals are wasted every year under our present system. One of the most important questions in national reconstruction will be a better and saner use of fuel. The subject is now being investigated, and remarkable developments may be expected in the direction of the utilisation of power and heating and the utilisation of by-products.

In co-operation with my friend Mr. C. M. Hughes, we have evolved a process which will enable a fuel to be made without pressure at any industrial locality from the waste products to be found in that locality which may possess any calorific value. This process is a humble but very important part of a great scheme for the proper utilisation of fuel. It provides for immediate necessities and utilises a residual product now of comparatively small value.

I have prepared a rough chart showing "The Age of Coals." Previous to the forty million years which are there shown, our old world had been spinning round in space, slowly solidifying, acquiring its rocky crust, its ocean and its atmosphere. This process had possibly been going on at least since seventy million years ago.

Thirty million years ago, during the Silurian Epoch, graphite, the first of the coal family, was forming. The first fishes can also be traced in this epoch.

During the next epoch the Devonian sea serpents were developed from fishes. To this epoch belong the seams of coal on Bear Island. They are the oldest known humic coals in the world—about twenty-four million years old.

The Carboniferous Epoch lasted from about twenty-four million to eighteen million years ago. That is, for during six million years the greatest and finest coal measures of the world were being formed. Certainly in England and Wales our coals are practically all of the earlier Carboniferous Epoch. In the United States all the most important coals are of the same epoch, but on the Continent and in the Southern Hemisphere generally the coal measures are of the later Carboniferous Epoch and also of the Permian Epoch, which lasted up to about fifteen million years ago.

During the Secondary Geological Age the crocodiles and first land creatures developed into mammals and flying dragons into birds. Tropical flora was everywhere. Coals of these epochs (about twelve million years back) are found in China and Japan. There are also some examples in Britain, in Hungary and in Russia. During the Cretaceous Epoch good brown coals and lignites were developed in the Rocky Mountains, Alaska, Japan and elsewhere (between six and three million years ago).

The Tertiary Age lasted about two and a half million years, during which the bat, crocodile, hippopotamus, horse and the ape have appeared and developed. Modern trees

*Read before the Society of Architects, June 7, 1917.

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and flora appeared. Brown coals and lignites occurred in the deposits of this age in Germany, Hungary, Russia, Japan, Australia, New Zealand and elsewhere.

The present age began about half a million years ago. First came a period of several advancing and retiring glacial movements over the Northern Hemisphere, and during the last hundred thousand years the Caveman, with his flint hatchet, has advanced to what he is to-day, with his scientifically murderous methods of warfare. Of this age peat is the only form of coal formations.

The word coal or coke until recently meant fuel, but to-day it means any of these carbonaceous rock formations which may be used as fuel—such as lignites, brown coals, sapropelic, humic and anthracite coals. Outside of this list, at one end, is peat and at the other graphite; both of these belong to the coal family. The ages of all are shown on the chart.

The various varieties appear to pass from one to another. We all know the vast difference in the ordinary house coal; they are classed under the general title of Humic or Bituminous; some of them have similar qualities to the brown, others to the sapropelic or to the anthracite coals.

It is not the age alone which determines these various characteristics. The idea is now discredited that peat, during the ages, has passed through the various grades of coal until it became anthracite. By a careful study of the associated rocks and the coal measures themselves, various theories have been advanced as to the original substances and the methods by which the various coals have been formed.

During the seventy odd million years required to mould the globe from a molten mass to its present, the great volcanic upheavals produced repeated contortions of the earth's surface. These violent contortions and the glacial movements of the Northern Hemisphere account for constantly recurring physical actions of varying forms.

Therefore, it is urged that by a combination of these various operations, during millions of years, the innumerable varieties of coal throughout the world have been produced. The deposits or aggregates vary, the matrices vary, and the methods of production vary. Consequently it may be said :—There is no standard coal. If this has been made clear, the difficulties of making an exposition of our artificial coal will at once disappear.

The main problem before us is :—

(*a*) The utilisation of the waste products of any calorific value.

(*b*) The production by unskilled labour and existing machinery.

(*c*) The saving of transport.

If a method of production could be found by which an aggregate of breeze could be concreted by such matrices as lime, pitch or glucose, the main problem would be nearly solved.

Every architect or engineer will recognise the possibility of concreting by the addition of lime, chalk, or other calcium carbonate. They will also recognise the need of carefully apportioning the various aggregates to avoid too dense a substance on the one hand, or too open and friable a substance on the other.

In producing a satisfactory fuel, the main objects aimed at would be non-friability, good flare, non-caking, good cooking, good incandescence and non-clinkering, otherwise a free combustion with good calorific value at a low price.

When one considers Nature's varying methods of producing coal, it will not be difficult to understand that man must not expect to produce it on any one uniform plan. The characteristics of the varying aggregates and of the varying matrices require that the waste products of each locality should be carefully studied before determining upon the most satisfactory method.

Further, the use to which the fuel has to be put must be considered; that is, if it be required for open grates or closed stoves, or if a high calorific value or a bright burning coal be the chief desideratum. It has been ascertained, however, that from these varying conditions certain relative proportions can be determined of a more or less uniform character, and this has been systematically done.

A coal is here shown which has been concreted from coal dust alone, another from coke dust alone, another from destructor ash alone, another from destructor ash and coal dust, and another from clinker, bar ash and sawdust. It will be seen in the fire that the better grades burn like Nature's coal, the lower grades like coke; they all flare, coke and incandesce. Further, these artificial coals will be found to be more lasting; in the same way as a good artificial stone is more lasting than most stones made by Nature.

The machinery and plant required practically exists in all industrial centres. The essentials are crushers or breakers, screens, drying tables, mixers and moulds such as cast away pails, baths, etc. For the cooking process either ovens or boilers can be used, the main object at the present time being to utilise any existing plant with unskilled labour.

The cost depends mainly upon the value put upon the bases, the cost of the matrices, such as glucose, pitch and other bitumens, and the cost of the chalk or other calcium carbonates. For instance, the destructor ash and clinker at Eastbourne is valued at 6d. a ton, whereas at Birmingham an allowance is made of 2s. 6d. a ton. The coke breeze in London is valued at 6s. a ton, and in Birmingham at 1s. The price of hard pitch is quoted 38s. a ton at Eastbourne, 22s. at London, and 18s. at Birmingham. On the other hand, the price of chalk is 3s. 6d. a ton at Eastbourne, 6s. at London, and 16s. at Birmingham.

Speaking generally, the cost of materials of these seven typical examples would be, roughly :

Calorific Values. B.T.U.S'.	Samples.	Per ton.
7,500	No. 1, Eastbourne destructor ash	11.0
8,040	No. 2, Maples destructor and coal dust..	4.6
10,320	No. 3, Maples destructor and sawdust..	9.0
10,540	No. 4, Birmingham destructor and coal dust.....	8.0
11,340	No. 5, Birmingham coke dust	7.0
12,600	No. 6, London coke dust.....	10.0
12,820	No. 7, Staffordshire coal dust	10.0

The cost of the labour and establishment charges in the British Isles would not be more than 5s. a ton.

The calorific value of each sample is shown in the left column.

This schedule makes the following facts evident :—

1. That the millions of tons of coal-slack can be concreted, without pressure, into an excellent coal.

2. That all the powderous brown coals can also be concreted into a good transportable coal.

3.—That all the coke dust, accumulating in the gas works, can be similarly utilised.

4. That an excellent fuel can be produced from sawdust in all the timber countries of the world.

5.—That the household ashes and the municipal destructor can be made into cheap flaring coke.

6.—That all industrial concerns consuming more than ten tons of coal a day can reduce their bill by at least one-third, and also use of their accumulating waste products.

7.—That this work can be done by existing machinery and unskilled labour.

I therefore invite your consideration as to whether our main problem is not solved. I submit that these various aggregates or débris can be concreted into fuel by man in twenty minutes, or if you like in twenty days; while Nature's better but longer process has acquired twenty million years!

When it is remembered that over fifty million of tons of coal were exported last year from the British Isles, the national and international importance of this process of making a good fuel will be at once seen.

This question should be taken in hand at once, so that we and our Allies may be ready with next winter's fuel supply.

Upon the receipt of samples of any waste products of calorific value from any centre, tests can be made to determine the most satisfactory formula, and a licence to manufacture can be granted with one dominant restriction, namely, that the fuel should be supplied to the consumer at a profit of not more than 25 per cent.

FINISHING CONCRETE SURFACES WITH CARBORUNDUM BRICK.

First, remove the forms as soon as practicable after the concrete has been poured, and wet the concrete surface with water; for a railing, this will mean anywhere from twenty-four to thirty-six hours. Then with a sharp tool remove the lips and edgings left where form boards met.

Second, fill all holes with a 1 :2 mortar at once. Then float all surfaces, where edges have been removed and where holes have been filled, to an even, uniform surface.

Third, allow the concrete to dry for a week or ten days after following the above procedure. The length of time required for drying and curing before rubbing with a carborundum brick depends entirely upon the weather, the length of time the concrete requires to harden, and to a certain extent upon the aggregate.

When the concrete has dried sufficiently, the next step is to treat the surface with a cement wash. To make the wash add enough cement to a pail partly filled with water to make the mixture of a creamy consistency. Apply this creamy mixture to the concrete surface with a brush, being careful not to apply too much at any one place, and at the same time enough to fill all the pores. No more surface should be treated in this manner than can be rubbed the following day.

After the cement wash has set twenty-four hours it should be rubbed off with a carborundum brick by applying water ahead of the brick with a brush, and working the brick in a circular manner. No attempt need be made to wash off the material that is ground off by the brick. This should be left in place and the curlycues straightened out with a dry or only slightly damp brush.

Care should be taken to rub off only the cement wash and no more, for if additional material is rubbed off the aggregate will be exposed. The purpose of the wash is to fill all voids and air holes that appear upon the surface when the forms are removed. The rubbing will not affect small holes that have been filled, but, on the other hand, will bring the whole surface down to an even, smooth finish of uniform colour; something that cannot be obtained in any other way.

To facilitate the rubbing it is important that the concrete be well tamped at the time it is placed in the forms. It is equally important that the form lumber be in good shape, free from knot holes, slivers and splinters, for no amount of rubbing can remove these blemishes or marks.

Concrete which is too wet or sloppy should not be poured into the forms. If a soupy concrete is used, when the forms are removed the concrete has a sandy texture and is hard to smooth up. On the other hand, it should be reasonably wet and should be tamped into place rather than run into place with an excessive amount of water.

In railings and balustrades it is quite important to use an excessive amount of rather fine sand and cement and not too much coarse stone. By doing this a much smoother railing will result.—By W. M. Conway.

Lieut. Leonard Tysoe, deputy borough surveyor of Hammersmith, has been killed in action. He was articled to Mr. W. H. White, city surveyor of Oxford, and served subsequently in the borough surveyors' offices at Richmond (Surrey) and Bermondsey.

The annual summer conference of the Association of Managers of Sewage Disposal Works will be held at Worcester on Saturday, July 7. Mr. Thos. Caink, Assoc.M.Inst.C.E., the city engineer, will read a paper on "The Activated Sludge Process of Sewage Purification."

The Rev. A. Lombardini has commenced a series of Friday midday addresses at St. Botolph, Bishopsgate, on "Old Masters and their Message." The painters of the Italian School have been chosen for June, viz., Fra Angelico, Botticelli, Correggio, Leonardo da Vinci, and Piero della Francesca.

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PROFESSIONAL AND TRADE SOCIETIES.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—On Monday last the general business meeting (postponed from the 4th inst.) was held, for the election of the Council 1917-18. The number of voting papers received was 556. The following are the results:—President, Mr. Henry T. Hare; Vice-Presidents, Sir John J. Barnet, R.S.A., Mr. Walter Cave, Mr. J. Alfred Gotch, F.S.A., and Mr. Paul Waterhouse, M.A.; hon. secretary, Mr. E. Guy Dawber. Members of Council (in the order of voting): Mr. H. V. Lanchester (past vice-president), 395; Mr. Robert Atkinson*, 352; Mr. W. R. Lethaby*, 346; Mr. Gerald C. Horsley, 345; Mr. Andrew N. Prentice, 338; Mr. John W. Simpson* (past Vice-President), 334; T. Edwin Cooper*, 305; Mr. S. D. Adshead, M.A., 304; Mr. George Hubbard*, F.S.A. (past vice-president), 303; Mr. H. D. Searles Wood, 290; Mr. Arthur Keen, 286; Mr. F. M. Simpson*, 273; Mr. Alexander G. R. Mackenzie*, President A.A., 267; Mr. John James Joass, 262; Mr. Giles Gilbert Scott*, 253; Mr. H. P. Burke Downing, 251; Mr. D. Barclay Niven, 249; and Mr. Percy S. Worthington, M.A.Oxon, 239. The newly-elected members marked * were not members of the outgoing Council. The following candidates were not elected, and among these, those marked † were members of the outgoing Council. The names are given in order of voting:—Mr. Max Clarke, Mr. Walter Tapper, Mr. Sydney Perks, F.S.A., Mr. Alexander N. Paterson†, M.A., A.R.S.A.; Mr. Alan Edward Munby, M.A. Cantab; Mr. A. R. Jemmett, Mr. Raymond Unwin, Mr. Francis W. Troup, Mr. Harry Redfern†, Mr. Matt. Garbutt, Mr. W. Gilbee Scott†, Mr. W. Henry White, Mr. Alfred Cox, Mr. H. Victor Ashley, Mr. W. E. V. Crompton, Mr. W. Campbell Jones, Mr. Fred Rowntree, and Mr. Ernest R. E. Sutton. The Associate members of Council are:—Mr. L. P. Abercrombie*, M.A., 358; Mr. W. R. Davidge, 331; Mr. Leslie Wilkinson*, 317; Mr. L. Rome Guthrie, 286; Mr. Horace Cubitt, 256; and Mr. Herbert Shepherd, 240. The newly-elected Associate members marked * were not on the outgoing Council. The following candidates were not elected:—Mr. S. C. Ramsey, Mr. Herbert A. Welch†, Mr. A. W. Hennings, Mr. P. M. Fraser, and Mr. Basil Oliver. The Past Presidents chosen are Mr. T. E. Collcutt and Mr. Ernest Newton, A.R.A. The following are the representatives of allied societies:—Messrs. Robert Burns Dick (Northern Architectural Association); John Bradshaw Gass (Manchester Society of Architects); Edward Percy Hinde (Liverpool Architectural Society); William Kaye-Parry (Royal Institute of the Architects of Ireland); Adam Francis Watson (Sheffield Society of Architects); John Watson (Glasgow Institute of Architects); Sir Frank W. Wills (Bristol Society of Architects). The representative of the Architectural Association is Mr. Henry Martineau Fletcher. The auditors are Messrs. Henry Albert Saul and Hubert Springford East.

LEGAL INTELLIGENCE.

LORD MAYOR OF LONDON'S LIBEL SUIT.—Alleged Bogus "Scene" at a Company Meeting.—Damages for alleged libel were claimed by the Lord Mayor of London, Sir William H. Dunn, in an action which was commenced before Mr. Justice Darling and a special jury on Monday. The defendant, Mr. D. S. Mackey, secretary and general manager of the Greenwich Inlaid Linoleum Company, admitted publication of the words, but denied that they were defamatory, and alternatively pleaded privilege. Mr. Rose Innes, K.C., for the plaintiff, explained that Sir William Dunn was a surveyor and a director of the Greenwich Inlaid Linoleum Company, Limited. The alleged libels were contained in letters written by the defendant regarding Sir William's claim to a fee of about 200 guineas for his work in getting the firm's insurances reduced, by which a considerable economy was effected. Giving evidence, Sir William Dunn said that when the works closed down in January, 1915, owing to the war, the defendant's salary was £2,600 a year, and the witness thought he should take £1,000 a year under the circumstances. Sir William added: "That is the head and front of my offending." Cross-examined about a cheque for £1,000 out of which he paid the insurance premiums, the witness said this was paid into his own account. He wrote asking if he should return the balance, or set off fees due to him against it. He never received a penny for the insurance work. The witness declared that it was an absolute lie to suggest any collusion between himself and Sir William Treloar in the matter. Sir William Treloar, chairman of the Greenwich Company since its formation, said it was untrue that the witness and the plaintiff attempted to browbeat another director. The defendant's counsel said he made no imputation against Sir William Treloar. Giving evidence, the defendant said that he objected to the payment of 200 guineas to the plaintiff, as it was never authorised, and he took up the position that a director could not charge for a valuation of his own property. He suggested no dishonesty on the part of the plaintiff in not handing over the balance of the £1,000 cheque after paying the insurance premium. It was, he thought, merely an irregularity. In cross-examination, Mr. Mackey said he still believed that the plaintiff and Sir William Treloar "arranged" a scene at a directors' meeting to bluff another director.—The hearing was adjourned.

E. H. SHORLAND AND BROTHER, LTD. (IN VOLUNTARY LIQUIDATION).—Notice is given, pursuant to Section 188 of the Companies (Consolidation) Act, 1908, that a meeting of the creditors of the above-named company will be held at the Chartered Accountants' Hall, situate 60, Spring Gardens, Manchester, on Friday, June 22, 1917, at 3 o'clock in the afternoon. Mr. J. W. Beever, of 6, Princess Street, Manchester, is the liquidator.

Our Office Table.

As the result of a conference between the employers and the union, under the chairmanship of Sir George Askwith, an additional war bonus, amounting to about 10 per cent. on the wages, has been granted the compositors, and following this an agreement has been arrived at for granting a similar bonus to all members of the societies in the printing industry in London, which number thirteen or fourteen. The more newspapers reduce their size, in compliance with the requirements of the Paper Commission, the more printers put prices up, and the result presently will be no papers at all and no printing!

A useful return has been completed by Mr. J. H. Drew, borough surveyor of Grantham, relating to workmen's wages in sixteen boroughs and towns, with populations varying from 9,850 to 60,000, showing . . ges ordinarily paid and the advances made, or war bonus paid. The return includes particulars as to hours worked per week, the holidays allowed, rates of pay for overtime, and for all classes of workmen in the highways and sewers departments, and includes the salaries paid to the surveyor's assistant and clerks.

Before the Law Society Appeal Tribunal last Wednesday Mr. Jacob Epstein, sculptor, applied for exemption. It was stated that the appellant was 36, married, and with no children, and that he had been refused exemption by the local Tribunal on the ground that a sculptural artist only suffered temporary inconvenience by serving in the Army.—The Military Representative said the question was whether or not it was a one-man business. It was decided to allow the appeal, principally on the ground of the "national interest," and to grant exemption for three months, with leave to apply again. The Tribunal would give no undertaking to renew the exemption then, the Chairman saying it would all depend on the needs of the Army in the future.—The Chairman (addressing Mr. Epstein): Would you like to join the Volunteer Training Corps?—Mr. Epstein: I would not mind.—The Chairman: Then you shall.

During the past few months the housing difficulty in the Halesowen district has become very acute owing to the erection of several large factories, and as a result efforts are being made to induce the local authorities to provide accommodation for those workers who have come into the district. The marked shortage of houses has for a long time produced a system of competition amongst would-be tenants, with the result that landlords have frequently accepted offers much higher than the original rent, simply because of the inability on the part of married people to secure hourses. The rural council has the matter in hand, and it is likely that a proposal to spend something like £35,000 on the erection of artisan dwellings after the war may be proceeded with in the near future.

Construction work in Aden, both public and private, has been very much curtailed on account of the abnormally high prices for all sorts of building materials. An interesting, though not entirely new, practice has developed in the execution of small but necessary pieces of work which would ordinarily involve the use of cement. In place of cement concrete a mixture called lime concrete is being used. It is composed of equal parts of line, sand, and pumice. The pumice is ground fine, and is obtained in unlimited quantities from the volcanic deposits that form the peninsula of Aden. Lime concrete takes much longer to set than cement, but the results have so far been quite satisfactory. This material also is comparatively inexpensive. The chief engineer of the Aden Port Trust is now using it in a small and experimental way for construction which is covered by, and consequently exposed to, the action of sea-water.

A third edition is published of "Electrical Engineering Practice," by J. W. Meares, F.R.A.S. (London: E. and F. Spon, Limited. 25s. net). The first two editions were written for engineers in India, but the present issue has been recast and brought up to date with a view to the requirements of a wider public. Its aim is to "fill the gap" between the various pocket-books of mere data and the works written for specialists in the various branches of electrical engineering. The volume, which covers 521 pages, is likely to fulfil its purpose.

"How to Do Business with Russia," by C. E. W. Petersson and W. Barnes Steveni (London: Sir Isaac Pitman and Son, Limited, 5s.), will be found useful as likely to open up trade relations with the Russians, on whom it cannot be too often impressed that methods common to Western Europe will mostly be found futile. The authors describe each district and its capabilities and characteristics, and a good deal of practical advice is given about travellers, agents, banking facilities, trade terms, etc. It is evident that the Russians like British goods, but that they comparatively seldom get them, though many things are sold as "English" which are doubtless the manufacture of the more enterprising and ever unscrupulous German.

An interesting illustrated brochure by Mr. H. Lloyd Parry, the town clerk of Exeter, and Mr. Harold Brakspear, F.S.A., on the old Benedictine monastery, St. Nicholas Priory, is published by Messrs. W. J. Southwood and Co., Exeter. The historical summary by the town clerk briefly but lucidly covers the whole existence of the building from its growth out of a prior foundation by Gytha, the mother of King Harold, to its repair under the advice of Mr. Brakspear and the supervision of Mr. Lewis Tonar, which was completed in November last. The illustrations include the priory seals, a view of the priory, the Saxon cross shaft, the guest-room, the crypt, the Tudor room and oriel, the kitchen, the window in the guest-room, and a plan. Visitors to the ever-faithful city should not fail to procure a copy of this well-conceived souvenir of one of its many architectural treasures.

The City Council of Rome has been called upon to approve of the demolition of the Palazzo Caffarelli, the seat of the German Embassy to the Italian Court. The building is of no architectural or historical value; but it occupies the site on which was built the temple of Jupiter on the Capitol. The plan for the isolation of all the vestiges of ancient Rome so as to form a monumental zone of the Capitol and the Fora necessitates for its execution the demolition of a certain number of buildings, including the Palazzo Caffarelli. Senator Lanciani, the archæologist, supporting the motion of the meeting of the City Coun-

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cil, stated that the throne of the Kaiser in the large reception room of the German Embassy is exactly on the same spot where the throne of Jupiter existed in the ancient temple. The remains of the temple are for two-thirds enclosed in the property of the German Embassy. The City Council voted unanimously in favour of the demolition of the building, and this will soon be carried out.

At the annual meeting of the Norfolk and Norwich Archæological Society on Thursday, at Norwich, a letter was received from Prince Frederick Duleep Singh, dated from a corps of the British Expeditionary Force in France, expressing opposition to the war memorial chapel proposed to be added on to the east end of the Cathedral. His objections, he added, were only what might be called æsthetic. "Personally," he added, "I am strongly in favour of the purchase of Bishop Hall's Palace, and converting it into a home for disabled Norfolk soldiers and sailors. If I remember aright, there was a chapel there once, and this could be made the actual 'memorial.' It could be consecrated to the memory of the fallen, and have their names inscribed. This is only a suggestion, and I have no doubt others and better ones might be made. But I do feel that an opportunity ought to be given to archæologists—who are opposed as strongly as I am to the new chapel idea—to be able to express that opinion without incurring any opprobrium. Had the suggested war memorial nothing to do with an ancient building, antiquarians, as such, would, of course, have no right to criticise: but, as it is, I think we have the right." The President said he did not care much about this idea of a home for disabled soldiers. In these days most people preferred to do something for themselves, and to be helped to do it if need be, instead of being shut up in a home. It seemed to him that the Cathedral idea was rather a good one, but of course, it would have to be carried out correctly in architectural respects. He did not think it was within the society's province to take any notice of the matter so far. The Dean, on being appealed to, said there was no motion before the meeting; and he had no remarks to make.

The seventh ordinary general meeting (season 1916-17) of the London Society will be held on Thursday, June 21, 1917, at 5 p.m., in the Hall of the Royal Society of Arts, 18, John Street, Adelphi, W.C. Monsieur Paul Lambotte (Directeur des Beaux-Arts) will give a lecture (in French) on "Impressions of London." Count de Lalaing, Envoyé extraordinary et Ministre plénipotentiaire (former Belgian Minister in Great Britain) will preside. The lecture will be followed by discussion and votes of thanks.

Two recent acquisitions have now been placed on view in the entrance hall of the National Gallery. One is the portrait of the Sultan Mohammed II., by Gentile Bellini, which formed part of the Layard bequest, and the other is a figure of a flying Angel by Francesco Pesellino, bequeathed by the Countess Brownlow. This last work is of special interest to the Gallery, as it formed part of Pesellino's great altar-piece, now dismembered, the central group of which, representing "The Trinity," has long been among the treasures of the Tuscan Room at Trafalgar Square.

What the auctioneer describes as one of the finest estates in the world, was offered for sale at Winchester House on Monday. It is a large area in West Brompton, Earl's Court, Kensington, and Chelsea. Upon it there are 1,340 houses, 19 blocks of flats, 18 shops, 150 stables, and three public-houses. When James Gunter, the famous pastrycook, bought the ground at the end of the eighteenth century it was mostly occupied by florists' nurseries. Lieut.-Colonel Sir Nevill Gunter is the owner, and he is on service in France. The property produces £17,222 from freehold ground rents, and has an estimated ultimate rent-roll of £200,000 a year. Bidding began at £350,000, and very soon reached £540,000. The highest bid was £549,500, and as this did not reach the reserve price the property was then put up in lots. Some of these were sold, but the most important were withdrawn.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

***Drawings of selected competition designs, important public and private buildings, details of old and new work, and good sketches are always welcome, and for such no charge is made for insertion. Of more commonplace subjects, small churches, chapels, houses, etc.—we have usually far more sent than we can insert, but are glad to do so when space permits, on mutually advantageous terms, which may be ascertained on application.

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Advertisements for the current week must reach the office not later than 3 p.m. on Tuesday. Front-page advertisements and alterations or stop orders for serial advertisements must reach the office by first post on Monday to secure attention.

Received:—E. A. C.—B. M. A.—A. A.—S. F. Co., Ltd.—M. and C.—C. J. and Co.—L. F. Co., Ltd.—W. L.—W. W.—J., Ltd.—K. G. and Co.—K. and Co.

M. S. A.—Yes.

PHILO.—Please send.

MAJOR D.—Have forwarded as requested.

S. H.—Your architect is the proper person to decide. On your facts we think you ought not to pay: but it is quite possible that you have not made allowance for present circumstances.

R. H. F.—The American method of moving houses and other buildings, which was the invention of Simeon Brown, of New York, was fully described by Mr. A. J. Mason in a paper read before the R.I.B.A. on January 17, 1842. You will find a fully illustrated report in the *Mechanics' Magazine* of March 25, 1843.

TRADE NOTES.

Boyle's latest patent "Air-pump" Ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, have been employed by the Supermarine Aviation Co., Ltd., Southampton.

At the annual general meeting of Chubb and Son's Lock and Safe Co., Limited, held at 128, Queen Victoria Street, London, E.C., on June 6, it was proposed by Alderman Sir G. W. Truscott, Bart., seconded by Sir Henry Holloway, and unanimously resolved: "That the hearty congratulations of the shareholders be given to the chairman, Sir George Hayter Chubb, Bart., and all connected with the management of the business, upon its continued and increasing success, and upon its approaching centenary, the first Chubb lock having been patented February 3, 1818."

As will be seen in an advertisement on another page, the partnership between Messrs. Frank G. Briggs Mr. Harry V. Wolstenholme, and Mr. Arnold Thornely, hitherto carrying on business as architects and surveyors at Royal Liver Buildings, under the style or firm of "Briggs, Wolstenholme, and Thornely," has been dissolved as from May 31 last. Messrs. Briggs and Thornely will continue to practise at Royal Liver Buildings under the style of Briggs and Thornely, and Mr. H. V. Wolstenholme to practise under his own name at Central Buildings, Blackburn. All moneys owing to the late firm should be paid to its account at Central Buildings, Blackburn.

CHIPS.

The Bridlington Town Council has increased the salary of Mr. C. Law Green, acting borough surveyor, from £3 to £4 per week.

The Cheltenham Corporation has engaged Miss Hooper, B.Sc., F.I.C., to undertake the analysis of the water at a charge of 5s. per hour.

The borough surveyor of Chichester, Mr. F. J. Lobley, has been instructed to prepare a scheme for converting the Butter Market into the headquarters of the fire brigade.

In memory of parishioners who have fallen in the war, a "peace" porch, surmounted by a Calvary, will be erected at St. Silas', Kentish Town, after peace has been declared.

Among recent presentations to the Guildhall Library is the following:—By Mr. Banister F. Fletcher, C.C., "Architectural Hygiene," written by the donor and his brother, the late Major H. Phillips Fletcher.

Alterations are to be made at the Cartwright Memorial Hall, Bradford, with a view to using the present café as a Natural History Museum. The café is to be accommodated elsewhere. The alterations will cost £400.

Mr. William Small, Worcester, has been elected an honorary member of the Royal Scottish Academy. Though resident in London for the greater part of his professional life, Mr. Small is a native of Edinburgh, where during the early 'sixties he studied at the Trustees' School and at the Academy's life class.

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June 30, 1917. Volume CXII.—No. 3259.

THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.2.

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OUR ILLUSTRATIONS.

Church of St. Peter, Barnsley. The Interior of Nave looking East and the Lady Chapel. Mr. Temple Moore, F.R.I.B.A., Architect.

Littlecourt, Farthingstone, Northamptonshire. Terrace Front. Mr. Walter Cave, F.R.I.B.A., Architect.

New Reredos, Esclusham, Wrexham, N. Wales. Mr. Cecil G. Hare, Architect.

The Problem of the Small Dwelling and its Solution. Two sheets of typical examples by Mr. Robert Thomson, Architect.

Currente Calamo.

The House of Lords has been losing prestige for years, thanks mainly to its habit of turning its back on itself when cajoled or threatened by vested interests. The latest instance is its second reading last Thursday of the South-Eastern Railway Company's Bill to strengthen Charing Cross railway bridge, which the Lords rejected last year. The railway vested interests—for it is notorious that the Underground Railway Trust is as hostile to the improvement of London as the South-Eastern Railway—are determined still to block the Strand and spoil the river. It is the obvious duty of all Londoners to prevent them, and we hope their efforts will be trebled and supported by some more virile organisation than that which, for some reason, has run away on the eve of the fight. We have dwelt many times on the utilitarian and artistic objections to the scheme, and can only express our astonishment that Parliament is so blind to the paramount importance of the rescue of Charing Cross from its unfortunate condition of that of a mere dumping-ground for the most out-of-date of our railway companies. Does anyone suppose that the clause in the Bill, providing that the £167,000 which the railway company proposes to throw away on the strengthening of the monstrosity which desecrates the Thames shall not be reasonable as compensation presently when Parliament decides to pull down the bridge, will be adhered to? The real purpose of the Bill is to interpose an impassable barrier to all future improvement. It is trench-warfare of the sort the Germans have maintained for two years, and which has cost so many lives and so much treasure to break through, and those who have conspired to render it for the time successful are as cowardly and as traitorous to the real interests of London as the "conscientious objectors" to the defence of the world's freedom from the Huns. We shall beat the railway Huns yet; but, meanwhile, they are chuckling in their dug-outs!

As usual with this Government, no sooner has a Minister got his seat in the saddle and shown willing than he is transferred to a post where failure is almost certain; thanks to the doubtless unconscious connivance of people who thwart offence against law and patriotism he is him, to restrain profiteering or any othe: powerless. Anyhow, we wish Lord Rhondda better luck as Food Controller than his predecessors, and are sorry he has thrown up the Local Government Board. But we are bound to tell his successor, as we should have told him, that the best way of saving the lives of thousands of babies is to give their parents decent houses to live in, and that all efforts in this direction are waste labour if those houses are not properly planned. We have some reason to believe that Lord Rhondda had brought to his notice the plans by Mr. Robert Thomson, which we are publishing week by week, and that he was impressed by the proofs we are giving of the utter uselessness and wasteful extravagance of some past Government and municipal efforts. If all we can do at the moment is to "get schemes ready," let us for goodness sake see that they are prepared on rational bases and by competent men. These will be found, as we have said again and again, among architects and builders, who will do all that is needful on sound financial lines, without doles, if only tided over the dearth of capital prevalent thanks to the war, and still more to Mr. Lloyd George's past Budgets, and given freedom from harassing local stumbling-blocks.

Mr. A. W. Skelton, of Nottingham, has contributed an article to the *Financial Review of Reviews* on the shortage of working-class dwellings. Mr. Skelton was one of the organisers of the recent deputation of property owners to Lord Rhondda. It shows that, taken altogether, there was in the seventy most populous towns in the United Kingdom no scarcity of houses until 1910, the year of the fatal Finance Act. During the five years before the passing of the Act the average number of houses erected in these towns, which contain nearly one-third of the entire population, was 34,000. Since then there has been a sharply progressive decline. In the year ending March 31, 1911, the number fell to 23,315; and, in successive years, to 18,880, 17,854, 17,207, and 10,398. Yet something like 114,000 new houses are needed every year in the whole of the country, and 32,176 in these seventy towns! The consequent overcrowding and increased sickness, especially among the young children, has been considerable, and, we believe, far outweighs any benefits derivable—which *were* to be derivable, perhaps we should say—from the Insurance Act.

There was an old nursery set of doggerel rhymes when we were "a happy English child" beginning:—

"As I was going to St. Ives,
I met a man with seven wives."

That, of course, was in the days before Liberal Cornish boroughs had to shut their open hands to provide for the poverty produced by polygamy. Now, St. Ives is too poor to offer its borough surveyor more than £3 10s. a week—Sundays included! It says "his whole time," and that he is, "in addition, to manage and supervise the waterworks of the corporation," when, possibly, he will, we should hope, be treated to a glass of the "new beer" now and then. No wonder some of our town-planning experts say the paucity and badness of town-planning schemes are due to the enormous additional work thrown on the surveyors, especially those paid on the St. Ives scale! To intending applicants—we can conceive of no other inducement, bearing in mind the assurance of the great American bard, that men may rise on stepping-stones of their dead selves to higher things—we offer our sympathy and advice to go and be taxi-drivers instead. They will earn more money, and can strike whenever they like!

A few more cheery and level-headed speeches like that of Lord Islington at the Playgoers Club last Thursday would, just now, help considerably to hearten all of us. The occasion was the first of a series of informal gatherings, participation in which in ordinary times is seldom the privilege of others than the best of the Bohemians whose names adorn the member-roll of the Club; and the subsequent utterances of Mr. Henry Arthur Jones and Mr. J. T. Grein admirably sampled the sparkling wine of wit and wisdom which cheers but not inebriates the happy Playgoers. It was good to listen to Lord

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Islington's assurances that our present sacrifices are not to be in vain, and that when peace is made it is not to be all give and no take as far as we are concerned as regards the arrangements which the Allied Powers will dictate to Germany. It was still better to hear that Lord Islington, whose past good work for the Empire in many fields has been of the solid sort that is more appreciated than talked about, is at one with those of us who believe that its true nexus is self-government by all the Dominions—India among them, as soon as she is ready for it. Perhaps the *bonne bouche* of the afternoon was "Dagonet's" virile reminiscences of the Victorian period, and his adjurations to all present to cherish and imitate the "best Bohemianism" of the days when there was more of it, and of the right sort. Anyhow, there were one or two of the old school round about him, who went away with many memories revived of the jolly days when the titles of dramatists and journalists were graven deeper in the hearts of those who knew and loved them than in all the rolls of the Peerage and Baronetage.

Experimental data on the obstruction of bridge piers to the flow of water are exceedingly scarce; so scarce, in fact, that, in the case of the New York, Lackawanna and Western Railway v. the New York, Lake Erie and Western Railway, engineers varied in their computations of the back-water caused by the proposed bridge piers of the Lackawanna Railroad in the Chemung River, by values ranging from 0.568 to 4.3 ft. Although it is true that part of this discrepancy was due to the different values of flood discharge assumed by the different engineers, yet most of it is attributable to uncertainty as to existing bridge pier formulas. We have perused therefore with much interest a valuable paper to be presented by Mr. Floyd A. Nathan to the American Society of Civil Engineers on the subject on September 17 next, which appears in the May issue of the Society's "Proceedings," and which we regret our present limited space hinders us from giving in full. The experiments were made on thirty-four different models of bridge piers, in order to determine the relative obstruction to the flow of water offered by piers of different designs. The method of conducting the experiments is described, and the existing theories for this phenomenon are reviewed; however, in order to show the relative efficiencies of these piers, it was found necessary to discard these theories. The paper presents a unique and simple formula which can be applied to this problem, making possible the comparison of the different piers by the magnitude of their coefficients in this formula.

The more remarkable conclusions arrived at may be summarised as follows:—(1) The best practical form of nose is either the half-round or the elliptical (of which a modification is suggested). These shapes give much better efficiencies than the pointed nose. The best form of tail is the double curved form, like a fish tail. The back-water is materially decreased by the adoption of such a tail. This form, however, is not practical. Modifications suggested produce the second-best results. These are both practical shapes. (3) The discharge coefficient may be increased from 1 to 3 per cent. by substituting an efficient tail for the square one. This means a decrease of from 7 to 25 per cent. in the amount of back-water at a stream velocity of 4 ft. per sec. This demonstrates clearly the importance of the shape of the tail of a pier. (4) The discharge coefficient can be increased from 5 to 6 per cent. by substituting a half-round nose for a square one. This means a decrease in the amount of back-water of from 35 to 45 per cent., with a stream velocity of 4 ft. per sec. (5) The decrease in the amount of back-water obtained by substituting a 90 deg. point at the tail of the pier for the square end, is negligible; hence it does not warrant the extra expense of constructing such an end. The round tail is far superior to the 90 deg. point, and is almost as efficient as the 45 deg. pointed tail. (6) For piers of the same design, up stream and down stream, the half-round ends give the least amount of back-water.

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION.

V.

By ROBERT THOMSON.

[WITH ILLUSTRATIONS.]

Turning to the accompanying elementary plans on Sheet IX., it will be seen that each composite pair comprises on the left a six-apartment parlour cottage and on the right a five-apartment dwelling, in which the floor area of the parents' bedroom, clear of the bedroom furniture, is greater than the total floor area of the parlour in its conjoined half. One of the objects in so conjoining these plans is that they may, at a later stage, be utilised, together with the plans on Sheet VIII., as evidence in a way which should help to dispose for good and all of the already threadbare question as to whether there should or should not be a parlour in the small dwelling

In the meantime the attention of the reader is specially directed to the parents' bedroom in each of the conjoined pairs, since these provide a particularly telling argument in favour of the necessity of adapting the shape of an apartment to the purpose which it is intended to serve, in order that the occupants may be enabled to make the best possible use of the space at their disposal. In plans 55, 57, and 59 this apartment is nothing more than a badly planned bedroom, in which the fireplace is flanked by the doorway, and the bed not only stands across the window, but is right in the direct line of draught between the window, when open, and the fireplace. There is little suitable space for furniture, and such a room could be neither comfortable nor convenient

In striking contrast to these apartments it will be seen that the corresponding apartments in plans Figs. 56, 58, and 60, so far as this floor area and the relative arrangement of doorway, window, fireplace, and furniture are concerned, only require to have a sufficient height of ceiling to provide adequate air space, in order that they may make uncommonly roomy and comfortable bed-sittingrooms, to which the parents might retire out of the din of the children in the living-room. The advantages resulting from a properly shaped, well-arranged apartment are particularly well brought out in the parents' bedrooms in the conjoined plans, Figs. 59 and 60, in which these two apartments are not only of exactly the same floor area, but the dimensions of both are exactly alike.

It will be further seen that the living-room in each of the six-apartment dwellings is greatly inferior to the corresponding apartment in each of the five-department ones, and that it is not only in regard to size, but in shape and arrangement also, that the inferiority consists.

In the parlour house the fireplace is in one of the narrow ends of the living-room, whereas in the conjoined five-apartment plans it is in the middle of one of the long sides, and the apartment is a through one, with a window on each of its two opposite ends, thus giving an outlook both back and front.

Another very important advantage of the five-apartment dwelling is that two of the doorways are so arranged relatively to each other that by leaving the door sufficiently ajar, not only can the mother while at work in the kitchen hear all that is going on among the children at play in the living-room, but she can be both seen and heard by them, and is thus able to exercise sufficient control to prevent serious mischief amongst them. As the class of people for whom such houses are devised prefer not to employ a nursery governess to look after their children, the power of control just referred to is of supreme importance in the home of such people.

Although the kitchen in Fig. 60 is larger, it is not one whit better than that in Fig. 59. The space gained by the extra width may fairly be called wasted, since the width of the corresponding apartment in Fig. 59 is adequate; and to give more than is absolutely necessary is simply to waste space where economy is so essential.

In order fully to appreciate the remarks in regard to these conjoined plans the comparisons ought in all cases to be carried back to the corresponding basis plan on one or other of the Sheets II. and III.

Although last week's article dealt with the kitchen and other working departments, the offices and conveniences in considerable detail, there still remain a few points which require to be touched upon. For example, it will be seen that the window of the working apartment is so arranged as to throw the light directly upon the cooking stove, and that the position of the sink relatively to that of the stove is such that, while the sink receives perfect light, the housewife is completely out of the line of radiant heat from the fire of the stove—a matter which is far too frequently overlooked. It should be noted that the entrance lobby is shown of sufficient width to temporarily accommodate the family coach, and that there is also room to hang up the hats and coats of the family.

Among many of the honest folk who occupy such houses, the custom is for the visitor to "lift the latch and walk in" unannounced, and as this mode of entrance is not infrequently embarrassing to the occupants, the roomy entrance lobby, by giving warning, would help to protect the household from the too sudden intrusion of the unwelcome stranger.

Although a high-pressure hot water supply is undoubtedly not only a great convenience, but also a great inducement to personal cleanliness, it would, perhaps, be going too far to insist on its inclusion in the equipment of the dwellings of the

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people until all vital requirements have been fully met therein; but the new class of dwelling to which the present series of articles is leading up accomplishes so much and does it so economically that the financial difficulty need no longer be a bar to providing the comforts of a hot-water supply in the homes of the wage earners.

While the complete office and other accommodation shown in the wing is sufficient for the largest dwelling in which the members of the household do all their own housework, it is essential in the smallest. For these two good reasons, therefore, the wing portion is shown of the same size in all the plans of the present educational series, and as these range from less than 650 square feet of roofed area upwards, the humblest of His Majesty's subjects need not despair of some day having an adequately equipped home, provided he and his fellow wage-earners take in hand the education of the gentlemen who at present pay themselves £400 a year each for having hitherto so grossly mismanaged the housing affairs of the nation.

"A few weeks ago Mr. T. Foley Cass, of Hull, gave an address to the North-Eastern Centre of the Sanitary Inspectors' Association held at Leeds, in which he reminded his audience that the housing question had not yet been solved. It was, he said, estimated that there was a sacrifice of 250,000 lives a year from a tolerance of a continuation of housing conditions which ought to have been swept away."

In order to end this criminally colossal waste of life—I call it criminal because it can be easily and cheaply ended—and "stop the decay in the national physique which is at present causing so much anxiety," it is only necessary that the people be provided with dwellings in which, at the cost of a very small cottage, they would have ventilation as perfect as that in a hospital and the use of a pure air body equivalent in volume to that of a very large villa. To provide such a dwelling is merely a matter of planning. Dwelling-houses are different from the usual commodities of every day life. In ordinary business those who knowingly deal in inferior goods do so because these are usually cheaper than the superior ones, but houses do not follow the ordinary rule of being "cheap when nasty." The exact reverse is indeed the case, the inefficiently planned dwellings being relatively more costly to build than the well-planned ones, and the more inefficiently they are planned the more costly is the limited accommodation which they provide.

In order to provide the plan of such a dwelling it was, of course, necessary that the work of planning should be gone about in a methodical way. In the planning of a small dwelling the architect is not a free agent. For example, in arranging the habitable and kitchen accommodation he must conform to the requirements of the fireplaces, so as to ensure that the heat of all fuel burned and as much of that leaving the fire with the fuel gases may be as fully and as effectively utilised as possible. To this end, therefore, it is essential that every apartment have an efficient chimney or exhaust flue and that all chimney breasts be wholly within the dwelling—breasts which are built against a party wall do not meet this requirement—and that since bedroom flues are, as a rule, infrequently fired, they must be run throughout their entire length alongside a smoke flue which is in regular use.

In the health-promoting class of dwelling which I have evolved the arrangement of ventilating flues, fireplaces, chimneys, and chimney breasts is in several respects unique. Although every apartment has either a chimney or exhaust flue, there are only two apartments in which there is a chimney breast, and both of these breasts are not merely within the dwelling, they are wholly within the central area of it, and are thus available for the performance of an important structural function which secures many important economic and other advantages. In these breasts the fireplaces and flues are so arranged that with only two fires—the one in the kitchen, the other in the living room—the waste gases are capable of heating the other three flues, thus ensuring ventilation in all five apartments. The two fires need not entail a greater annual consumption of fuel than the ordinary kitchen living room fireplace, since during the summer half of the year it is a positive comfort to be without a fire in the living room, while the economy of fuel which can be effected by an efficient cooking stove in the kitchen is sufficient to provide all the fuel required in the living room during the winter.

The question as to what is the best height of ceiling in small dwellings is another subject which requires attention. It has been frequently discussed, but the discussion has always hitherto finished off exactly where it began. In considering this question, there are two facts which should be borne in mind: the first is that it is only in small dwellings that a ceiling height of 8 ft. is preferred, and the second that this preference is not that of the occupants but of the experts who plan such dwellings. This subject, when squarely faced, does not appear to present any very great difficulty, if the requirements of the occupants be taken into account in considering it. For instance, one of the objects which ought to be kept in view is to provide for as much sunlight as possible getting into the dwelling. Another that the ceiling of the kitchen should be sufficiently high to enable its upper half to be utilised for the drying and airing of clothes; a third, that its height be sufficient to allow of ample storage space being provided for articles which are only seasonally in use, or are only infrequently required; the fourth, that a large living room requires a higher ceiling than a small one; and the fifth, that the materials employed in dwellings of existing types are more than sufficient to give a ceiling of 10 ft. 3 in. high when adequately utilised on competently planned dwellings of similar roofed area.

The question of the staircase is a third subject which calls for very careful consideration. Exhaustive investigations have failed to discover either a single drawback from which the occupants of the one storey type of dwelling suffer because of the absence of a stair, or even one solitary advantage from which the occupants of two-flatted dwellings benefit because of the possession of one. As a matter of fact, they have had the exactly contrary effect in making it clear that the presence of a stair in a dwelling in which economy is essential imposes many very serious drawbacks upon the occupants. Although the stair connects the upper and the lower storeys of a dwelling, the effect of providing two storeys is to divide the house into two portions, the upper of which gives a night and the lower a day dwelling, an arrangement which makes it impossible to adequately utilise the space which could be easily done if it were all on the one floor level. In the second place, the stair, with its approaches, landings, enclosing walls, and partitions, occupies space on two floors which entails the sacrifice of much-needed houseroom, thereby seriously prejudicing the health of the occupants of the dwelling. It further entails much extra labour on the part of the housewife, not only in traversing it many times a day, but in keeping it clean, and for such labour there is not the slightest profitable return. It also detracts very much from the convenience of the dwelling, and thus prejudicially affects the comfort of the occupants. By adding to the size of the structure, it increases the cost of building it, and it thus not only sacrifices space, but in doing so murders economy.

Anyone having the slightest technical knowledge of planning will at once see that the requirements already mentioned cannot possibly be met by any two-flatted type of dwelling—the stair alone absolutely precludes the possibility of using this type—and very little investigation is required to show that it is only necessary for the draughtsman to give effect, on paper, to the essential requirements already set forth, when the characteristic features of the only dwelling which is capable of solving the housing problem, which has hitherto effectively baffled so many generations of experts, will inevitably emerge.

When the fundamental principles underlying this scientific method of planning are thoroughly understood, it will be readily seen, even by the non-expert amateur, why there can never by any possibility be more than the one type plan thus brought out. It is, perhaps, hardly necessary to state that although there can never be more than this one type plan it does not mean that there need be uniformity in the external appearance of the dwellings. As a matter of fact, no two elevations need ever be exactly alike. It is here that the architect skilful in design, although perhaps weak in planning, can come in with effect.

(To be continued).

INTERNATIONAL SOCIETY OF SCULPTORS, PAINTERS, AND GRAVERS.

The twenty-seventh exhibition of the International Society at the Grosvenor Gallery is well above the average. There are 376 exhibits, and the eccentrics are not unduly prominent.

The Large Room is well hung, the premier position being given to Mr. W. E. Ranken's portrait of Mrs. Asquith (1), well done, but one has to "wait and see" quite all of her face, and then one doesn't. Mr. W. Nicholson has a fairly good portrait of "General Smuts" (4), and all will like his "April, 1917" (5), and his "Flower Piece" (10) and "Stocks" (16). Mr. Ambrose McEvoy has two portraits, one of "Lady Gwendoline Churchill" (11), and another of "Miss Elizabeth Asquith" (15). Mr. W. Dacres Adams scores with his "A Backwoods Ferry" (6), the colour scheme of which is excellent. Mr. H. Mann Livens contributes a well-ordered oil painting of the church of "St. Magnus the Martyr" (12). Mr. Charles Sims is well represented by his "The Piping Boy" (14) and "Remembrance" (37). The latter is delightful in theme and most able in treatment. It is a picture which sends one away thankfully refreshed and charmed in these days of distraction and danger. "The Frozen Pond" (13), by Mrs. Laura Knight, is a merry rendering of a winter scene, the more welcome, perhaps, in contrast with the mid-day temperature at the time of our visit. We do not care much for either of Mr. William Strang's exhibits. "The Buffet" (26) and "The Belgian Girl" (27) are both, of course, clever, but even of its sort there are different degrees of clever-

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ness. Among the other pictures in this room none should miss Mr. S. J. Lamorna Birch's "The Quarry Road" (24), "Moonlight: Chelsea" (28), by Mr. Walter Greaves.

The Long Gallery is almost as well hung and replete with good work as the Large Room. In addition to his portrait of "Countess Curzon" (30), in the former, Mr. P. A. De László has four in the latter —"Lady Rose Leveson-Gower" (56), "Mrs. Arthur Jowett" (58), "Right Hon. Lord Carnock" (102), and "Mrs. Arthur Wilson (105). "Going to the Races" (55), by Mr. Jack B. Yeats, is clever—tantalising, perhaps, with racing stopped, except in Ireland, of course! Miss Alice Fanner's "Yacht Race in the Solent" (64) will, however, please all who can still enjoy one of the few sports yet allowed those who can afford them. Most of us will perhaps better appreciate Mr. W. A. Wildman's "Lancashire Workers" (79). Mr. E. Proby Adams has a good oil picture of the "South Transept: St. Paul's" (81). Miss Mary Edis sends a portrait of "Mrs. Despard" (108). Mr. Algernon Newton's water-colour of "The Bag" (82) is cheering in these days of short commons. "The Main Street at Kairouan" (110), by Mr. Henry Bishop, is well done; and Mr. Daniel Veresmith's "Old Peter, King of Cats" (112) will not lack admirers.

The Corner Gallery has several good things. One is a good "Portrait of a Convalescent" (146), by Mr. Horace Taylor, rather like himself; if so, we congratulate him on his healthy recovery. There is also a creditable "Study of a Head" (164), by Mr. James Quinn. Mr. Walter Bates' "Le Belvedere des Revenents de la Guerre" (122) is likely to provoke a smile.

In the Small Gallery we notice some two good charcoal drawings by Mr. Steven Spurrier (175 and 183); some humorous sketches and etchings by Mr. George Belcher (194 and 202); a good drawing of the Poet Laureate (208), by Mr. L. Anning Bell; a tinted drawing, "The Tinkers" (214), by Mr. Augustus John: and a creditable water-colour. "L'Eglise Desolée, Festubert" (220), by Sergt. S. M. Litten.

There is a good bronze bust in the corridor of Mr. John Redmond (334), by Mr. Francis Doyle-Jones, and an attractive plaster "Portrait of a Norwegian Lady" (370), by Mr. E. Ruckton.

LORD RHONDDA ON HOUSING AND HEALTH.

Lord Rhondda received at the Local Government Board Offices last Wednesday a deputation from the Workers' National Housing Council, who laid before the President the claims of the organised workers of the country in regard to improved and increased housing accommodation. The deputation comprised Mr. J. Silas Whybrew (Secretary of the Council), Mr. W. A. Robinson (Liverpool Trades Council), Mr. A. T. Carter (Coventry Trades Council), Mr. Fred Bramley (Furnishing Trades Association), Dr. Ethel Bentham (Women's National Labour League), Mr. Byrne (National Union of Railwaymen), and others.

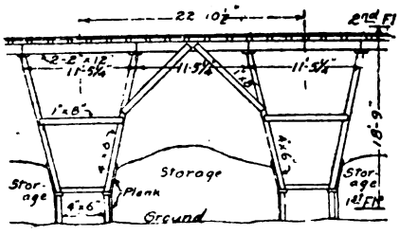
It was urged by the various speakers that the Government should give substantial financial assistance to local authorities, and that compulsory measures should be adopted to enforce the preparation of housing schemes. Further, that private persons or limited liability companies should not be assisted with public money. The deputation objected to "cheap" and "small" dwellings being erected, and urged the establishment of Fair Rent Courts.

Lord Rhondda, in reply to the deputation, said that as he was not a member of the Cabinet he could not tell what the attitude of the Government would be on this subject. He wanted them, however, to appreciate that at the Local Government Board they realised the great importance of the housing question. Personally he sympathised with most of the proposals put forward. He had favoured a conference of experts to advise him. Before the war private enterprise was responsible for 90 per cent. of the cottages, and he wanted to keep private enterprise going; but the Government would undoubtedly have to assist with finance. While little could be done, perhaps, before the end of the war, schemes could be got ready for immediate use after the war. Half a million houses would be required almost immediately after the war, and he was going to inquire systematically from local authorities to what extent they would be prepared to tender help.

Reverting to the relation of health to this question, Lord Rhondda said that it was his ambition, while he was Minister there, to save a thousand babies' lives a week. Then they would have half the deaths that occurred now up to the age of five years.

SPECIAL FORM SUPPORTS PROVIDE STORAGE WITHIN BUILDING.

When the recently completed mail-order building of the Robert Simpson Company, Mutual Street, Toronto, was under construction, Mutual Street, which was the only adjoining thoroughfare, had to be kept open for traffic. As the site was completely occupied by the building, this meant that storage space for sand, gravel, and cement had to be provided within the building itself.



Widely spaced bents instead of plain shoring provide storage space during construction.

To secure sufficient room specially designed form supports were employed on the ground floor, with timber bents providing a wide spacing for storage. As the ground floor story height was 18 ft. 9 in., and there was no basement, these bents were quite applicable, and found as economical as ordinary shoring. The accompanying sketch indicates the arrangement. The bents were constructed on the job, and were all alike. They were erected on 2-in. plank caps, resting on short 4 in. × 6 in. shores, which were placed and then cut off to grade. The bents were tapered, giving a space between the bents of 11 ft. at the top and 17 ft. at the bottom.

This bent construction was carried out for a width of six bays, thus providing six passages facing the street, which were carried through for a depth of three bays. At the end of the aisles the fourth bay was arranged lengthwise for the whole width of six bays. Each passage was 17 ft. wide and 75 ft. long, with a storage capacity of 250 yards. Teams would drive from the street into any of the first five bays and dump, returning by the connecting passage and the sixth bay, which was reserved for return only. Two bays were used for sand, two for stone, and one for cement. The total storage capacity was thus 1,250 yards.—"Contract Record."

Non-slipping shoes for ladders, recently patented by Messrs. C. R. R. and C. G. H. Swinden, 18, Queen Victoria Street, London, consist of two metal slides or cheeks secured to a wooden or other body, which has a concave centre on its upper face, and rubber bars or corrugations, studs, etc., on the lower face. Each foot of the ladder is placed in the concave centre of a shoe, and is prevented from kicking up or slipping out by a bolt or spindle against which the side of the ladder bears. The idea seems novel and useful.

COMPETITIONS.

Designs for Medals.—At the request of the Executive Committee of the Exhibition of Metallic Art lately opened in London, the Council of the Society of Arts placed three silver medals at the disposal of the committee for awards for medal designs. These were offered for the best portrait, the best allegorical or symbolical design, and for the best historical design. They have been awarded as follows by the Committee of the Exhibition, and the awards have been confirmed by the Council:—For the best portrait, to Lieut. S. W. Carline, R.F.C., for a portrait medal of Miss H. Carline and G. R. Carline. For the best allegorical or symbolical design, to John Pinches for his music prize medal, "Orpheus." For the best historical design, to Ernest G. Gillick for his designs for the reverses of the Polar, Tibet, and Long Service Naval medals for the Royal Mint.

Our Illustrations.

CHURCH OF ST. PETER, BARNSLEY.

These two photographs here given are now on view at the Royal Academy. Mr. Temple Moore, F.R.I.B.A., of Hampstead, is the architect of the church, which stands on a long, narrow site, the Lady-chapel extending somewhat beyond the east end of the choir. A processional path on both sides of the nave makes a good feature in the plan, and the same remark applies to the groined narthex at the west end. The nave is 49 ft. wide and 91 ft. long. Messrs. I. T. Wright and Co., of Leeds, were the builders. Local brick was used outside, interspersed with thin bricks to give a suggestion of proportion and scale to the work. Mr. Moore adapted the 14th Century style of Gothic for this building, and groined this church as shown. Both altar pieces came from Switzerland, and are of 17th Century date. We gave a plan and exterior view of St. Peter's, Barnsley, in our issue for April 5, 1912, and a big interior on July 18, 1913, both illustrations being reproduced from the architect's Royal Academy drawings.

LITTLECOURT, FARTHINGSTONE, NORTHAMPTONSHIRE.

This is a very extensive addition to a small existing cottage for Mr. P. L. Agnew. The three gables in the centre part facing the garden is the only old portion. The tower contains the water supply—pumped from a deep well. The music-room on the west side takes up the whole wing, and the ceiling is in the roof. There is no other floor in this part. The material is all of the local stone—a nice, warm brown with many dark blue veins. The architect was Mr. Walter Cave, 22, Sackville Street. The photograph here reproduced is now at the Royal Academy.

NEW REREDOS, ESCLUSHAM CHUROH, WREXHAM.

This reredos, illustrated from the Royal Academy drawing, consists of three subject panels, divided by pinnacles, clustering around octagonal shafts, which support small carved angels surmounted by canopies. The subject of the three panels is the Nativity, the centre panel depicting the Holy Family, and the two side panels the Shepherd and the Magi. These panels are crowned with cusped and crocketted ogees, with open tracery above. At either end is a circle, one containing the figure of S. Asaph and the other S. David of Wales. The material used is Red Hollington stone, and the work was carried out by Messrs. Bridgeman and Sons, of Lichfield, from the designs of Mr. Cecil S. Hare, architect, of Gray's Inn Square, W.C.

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION.

This series of typical plans commenced in THE BUILDING NEWS on May 23, were continued on the 30th ult. and in our issues for June 6 and 13, accompanied by Mr. Robert Thomson's interesting articles. To-day we publish sheets 8 and 9, which illustrate the fifth article on this most important subject.

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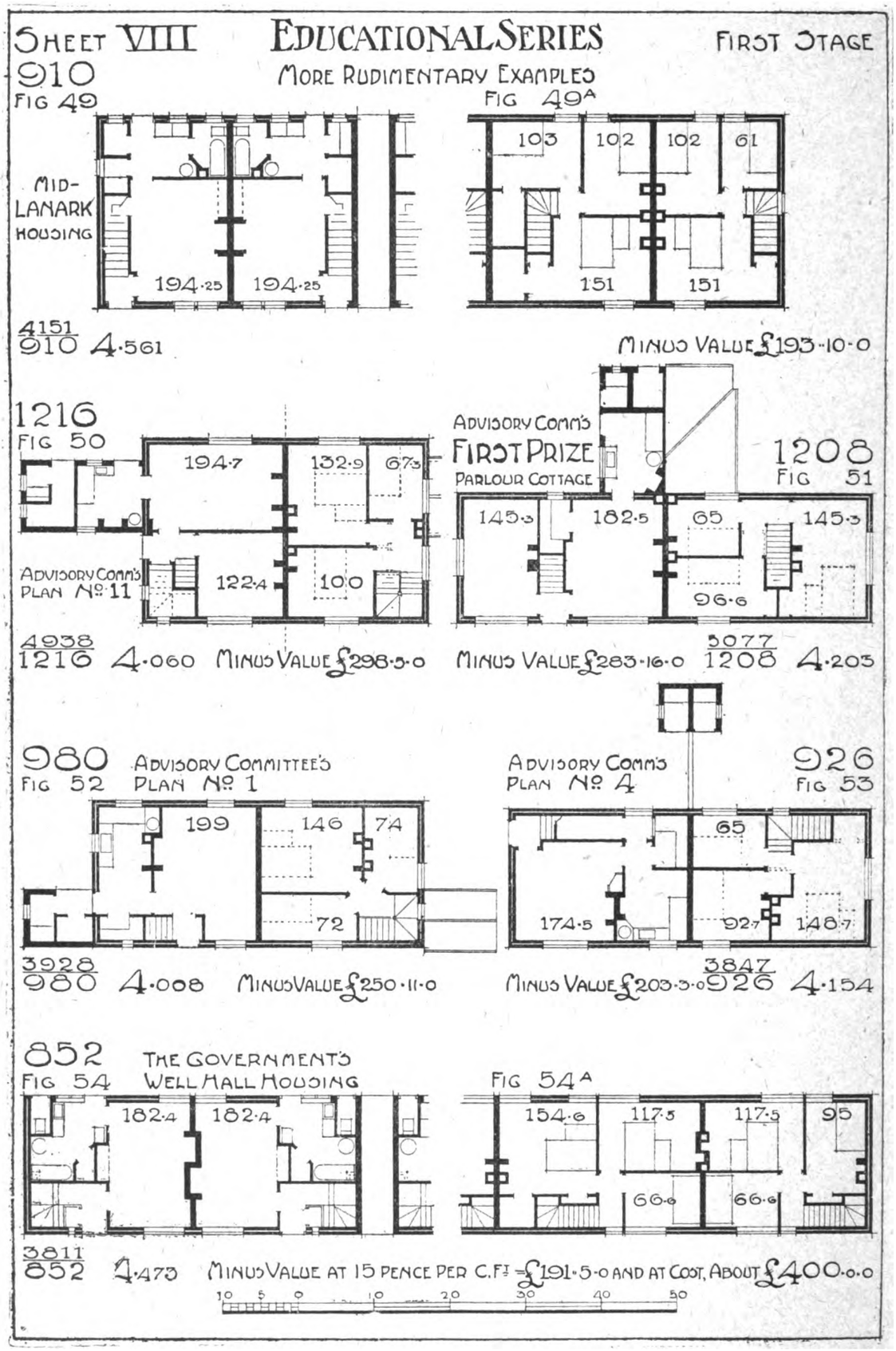

THE PROBLEM OF THE SMALL DWELLING AND ITS SOL

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T. J. Hanstock, Photo.]

INTERIOR, LOOKING EAST, ST. PETER'S CHURCH, BARNSLEY.

Mr. TEMPLE MOORE, F.R.I.B.A., Architect.

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LITTLECOURT, FARTHINGSTONE, NORTHAMPTONSHIRE : TERRACE FRONT.
Mr. Walter Cave, F.R.I.B.A., Architect.

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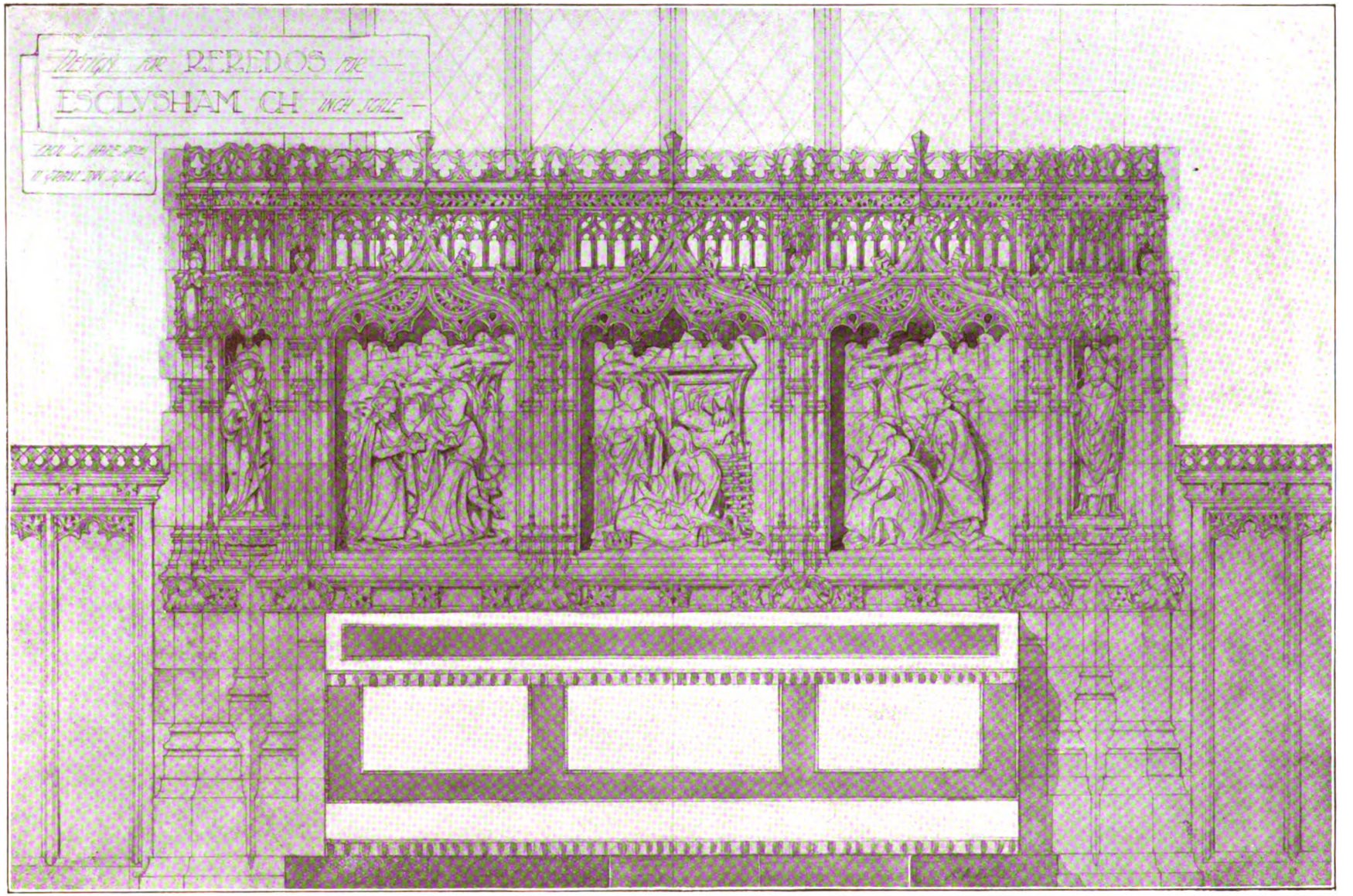

NEW REREDOS, ESCLUSHAM, WREXHAM, N. WALES.—Mr. Cecil G. Hare, Architect.

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THE CHAPEL, ST. PETER'S CHURCH, BARNSLEY.

Mr. TEMPLE MOORE, F.R.I.B.A., Architect.

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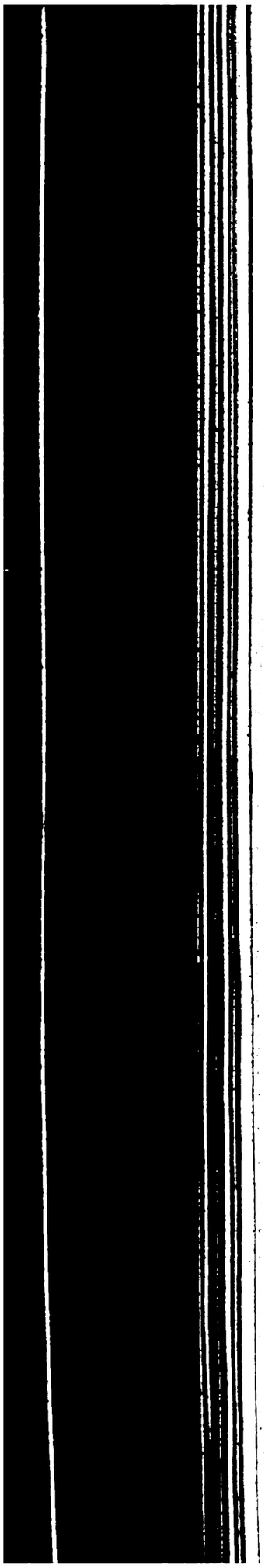

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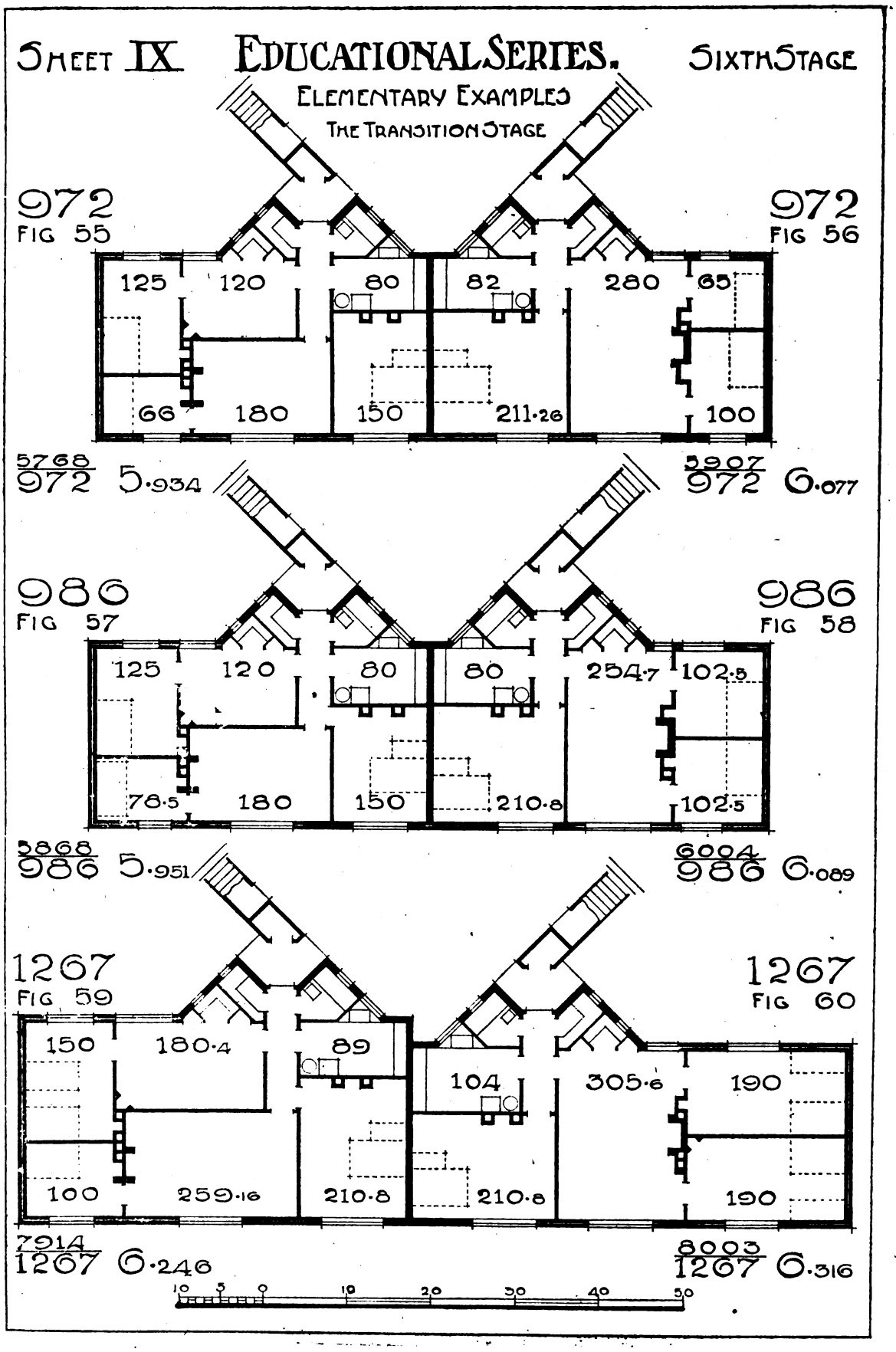

N: TYPICAL EXAMPLES.—By Mr. ROBERT THOMSON, Architect.

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TIMBER DECAY AND ITS GROWING IMPORTANCE TO THE ENGINEER AND ARCHITECT.

By C. J. HUMPHREY.*

To the structural engineer and architect the subject of timber decay is becoming of ever-increasing importance, due largely to the fact that the timbers which have entered into the construction of many important buildings during the past decade or two have failed to give the service expected of them.

It is a matter of common knowledge that this unsatisfactory record of service is primarily the result of using timber inferior in its resistance to decay; however, there also enter into the question in certain instances, very obvious errors in design and construction. In the earlier days, when a larger percentage of high grade structural timbers was available, delinquencies in construction did not result so disastrously and, hence, attracted much less attention from members of the engineering profession.

WHAT CAUSES DECAY?

Before entering the discussion further it may be well to outline to you briefly the causes of decay and the environmental factors which promote it. Decay is due almost entnrely to the growth of wood-destroying fungi within the tissues of the wood. There are many hundreds of different fungi which disintegrate wood in the forest, but the greater part of the economic losses in structural timber is referable to a comparatively few species.

These fungi are plants just as much as are trees and herbs. They differ merely in their form, lack of green colouring matter and methods of nutrition. While green plants absorb their food supplies from the soil through their roots, fungi derive their nutriment from the substance of the wood.

In the life-cycle of a wood-destroying fungus there are two distinct stages: (1) The vegetative stage, consisting of thread-like, usually much branched, filaments, termed mycelium; (2) the fruiting stage, which is nothing more than a compact mass of mycelium which takes on a definite form on the surface of the decaying timbers and serves for the production of spores and, hence, the propagation of the species.

Usually mycelium is confined within the wood substance, the fine cotton-like filaments ramifying throughout the tissues and filling the pores of the wood and the cells of the pith rays, as well as boring through the walls of the wood elements. It can roughly be compared to the root system of ordinary plants, for its function is the same, namely, that of an absorbing system.

CONDITIONS ESSENTIAL TO MYCELIAN GROWTH.

In addition to available food supplies derived from the wood constituents through organic action, fungi require certain essential conditions for their development. These are: (1) Sufficient moisture; (2) at least a small amount of air within the wood; and (3) a suitable temperature.

A suitable amount of moisture is, without doubt the most important factor in decay. The different wood-destroying fungi appear to have their own particular minimum necessary to fulfil growth requirements. Certain ones classified as "dry rot" organisms seem to get along on a comparatively small amount, while others thrive only in highly humid surroundings. In the case of "dry rot" fungi it appears to be more a question of the ability of the organism to tolerate dry conditions, or to produte their own moisture from the wood than any essential need for such conditions, for observations and laboratory tests demonstrate that an increase in the moisture under such circumstances leads to more rapid decay.

The need for at least a certain minimum of water is well shown under practical conditions. The points of failure in ordinary dry buildings are the points at which a little extra water is brought to, or held within, the timbers; for example, the ends of joists or girders set in brick or concrete walls, outer window casings, wood surrounding water pipes which may sweat or occasionally burst, porch floors and ceilings and other exposed trimmings where atmospheric moisture may collect at the joints, and last and often most important, basement timbers, either in contact with or close to moist soil.

Most people are familiar with the way in which posts and telephone poles rot at or near the ground line. Below the ground line the sapwood completely decays, while above the ground line a thin shell of dry, hard outer wood remains, with the decay running up beneath it. This is entirely a result of moisture conditions. The same phenomenon often occurs in water tank staves where the outer face is too dry and the inner face too wet to decay, while an intermediate zone may completely disintegrate.

AIR ABSOLUTELY NECESSARY.

A certain amount of air within the wood is absolutely necessary for decay. The organisms need it for their growth. In saturated wood, the air is, for the most part, displaced by water and fungus growth is impossible.

The very widespread idea that decay is due to alternate wet and dry conditions has developed through observation of the way timbers behave when exposed to the elements. Take, for instance, a railway tie partly embedded in soil. During a dry season it may dry out to such an extent that decay is very slow, then come the rains, and if only sufficient water falls to put the tie in a good moisture condition it begins to rot rapidly again, and will continue to do so as long as the moisture and temperature are favourable. If, on the other hand, there is a long-continued rainy period, the tie may soon become saturated and decay will stop again and remain practically at a standstill until the stick dries out sufficiently to admit the necessary amount of air. Thus, in the alternation of wet and dry conditions, one gets at some points intermediate between the dry and wet ranges a condition at which decay is at its maximum. If the timber were maintained at this optimum point, decay of the stick would be at its greatest and the alternating wet and dry conditions would be unfavourable. It is only under fluctuating natural conditions that alternation becomes of advantage.

The third essential condition for rapid fungous growth is a suitable temperature. For the majority of species the most favourable temperature lies between 75° and 85° Fahr.

The fact that all the species of fungi occurring naturally in a given locality can withstand the most severe winter weather shows their extreme hardiness to low temperatures. While growth may be almost completely suspended under these circumstances, the organisms will normally recover their growth capacity soon after being placed under more favourable conditions.

As a rule, light exerts a retarding effect on mycelial growth. This may amount to as much as an 18 per cent. reduction.

VITALITY OF MYCELIUM.

Mycelium in wood is often very long-lived in timber dried in the air at moderate temperatures. Once it gets well distributed throughout the wood, it is doubtful in very many cases whether the wood can again become free of infection as a result of natural atmospheric conditions. One case on record shows that a stick infected with one of our common species contained very vigorous mycelium after having been kept in a warm, dry room for four years.

FRUITING-BODIES.

The second stage in the life-cycle of a wood-destroying fungus consists in brackets or shelves, "toadstools," or often only compact incrustations which appear on the surface of the timber after decay has become well started. Their function is to produce spores, which are comparable to the seeds of ordinary green plants. Being very minute (finer than flour) these spores are readily carried about by air currents and, lodging on the surface of moist timber, at a favourable temperature, germinate to produce new infections.

A large part of the infection of timbers in the open occurs through the agency of these spores, but in buildings, where fruit-bodies are less likely to develop, they play a less important rôle.

DECAY IN BUILDING TIMBERS.

Having now briefly reviewed the conditions which favour the development of rot-producing fungi, I will cite a few specific instances of the more serious fungus outbreaks which have come to my personal attention. All of these cases could readily have been prevented had the men in charge of the design and construction been familiar with the fundamental conditions which invariably lead to rapid decay.

The principal sources of danger fall, roughly, under the six following heads:—

1. Placing non-durable timber in moist, ill-ventilated basements or enclosures beneath the first floor, or laying sills in direct contact with the ground.
2. Embedding the girders and joists in brick or concrete without boxing the ends.
3. Placing laminated flooring in unheated buildings in a green or wet condition.
4. Covering girders, posts or laminated flooring with plaster or similar coating before thoroughly dried.
5. General use of non-durable grades of timber in a green or only partially seasoned condition.
6. Use of even dry timber of low natural durability in buildings artificially humidified to a high degree, as in textile mills.

A further element of danger lies in the use of timber infected during storage, or which has become infected through neglect after purchase and delivery.

POOR VENTILATION IN BASEMENTS.

A considerable number of cases where poor ventilation beneath buildings, principally warehouses and frame structures, has started serious infections have come to the writer's notice. One case will suffice for illustration. This was a wholesale carpet and rug warehouse in a city on the Pacific Coast. It was a one-story frame building, four and a-half years old, with solid concrete foundations, except for four small screened ventilators in front about 5 in. by 18 in. in size. The building was set about 2 ft. above the ground, and the air beneath the floor was stagnant and very humid, especially at the back end, where the infection started. In the course of about three years the fungus had rotted out a portion of the floor girders, joists and flooring, and had done some injury to stored rugs. At this time repairs were made beneath the floor and also a new floor was laid on top of the old one. In less than a year the new floor and also the bottom of racks resting on it were badly rotted, causing further injury to the carpet and rug stock. In one case the fungus passed through the floor, the base of a rack about one inch off the floor, and twelve thicknesses of heavy rugs, eating large holes in them.

EMBEDDING TIMBERS IN BRICK OR CONCRETE.

Cases where girders and joists embedded in brick or concrete walls have rotted off in a short period of time are not uncommon. The writer has investigated one case on the Pacific Coast with considerable care. This was an unheated mill-constructed building used as a hardware warehouse. Heavy 12 by 20 Douglas fir girders, in a green condition, had been covered tightly with light galvanised iron at the ends and then embedded for about 18 in., without boxing, in concrete pillars at the outer walls. In about four and a-half years many of the timbers were thoroughly rotted at the ends and had to be removed. In an effort to control the rot, the concrete has been chipped away from the ends of the girders to allow them to dry. Borings taken in May, 1916 (after chipping away the concrete), in two girders between the depths of 4 and 6 in., show the following moisture percentages: 1 ft. from end, 19-20 per cent.; 2 ft. from end, 14-16 per cent.; 5 ft. from end, 11-13 per cent.

It is thus seen that the timbers were then in an air-dry condition at 5 ft. from the ends.

* Pathologist, Forest Products Laboratory, U.S. Department of Agriculture, Madison, Wis. Before Western Society of Engineers.

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Very little, if any, rot has developed at these points.

LAMINATED FLOORING.

There seems to be some divergence of opinion regarding the use of laminated floorings. In many buildings it has proven completely satisfactory. In others it has given very poor service. All the complaints investigated by the writer have shown the trouble to be due to the use of wet material. This, at best, dries very slowly in an unheated building. Covering such timber with plaster, or any other heavy coating, when moist will almost invariably cause trouble. If difficulties with laminated flooring are to be avoided, the timbers will have to be thoroughly air seasoned and kept dry during construction.

COVERING TIMBERS.

This leads us to a consideration of the advisability of covering materials in mill-constructed buildings. A number of cases already investigated indicate clearly that the practice should not be recommended except with extreme caution, and a close knowledge of the condition of the timber as it goes into the building. I will cite but one case. This occurred in a mill-constructed building in Chicago. This building was erected about three years ago, the construction being under way throughout the winter, so that the timbers were subject to periodic wetting from rains and snow. Such timbers as I have seen removed from the building on account of decay were, for the most part, of poor quality, low density, mostly rapid growth, very knotty and often with a large proportion of sapwood. Of eight girders and posts which were identified for species, seven proved to be loblolly pine and one shortleaf.

Laminated floors of mixed quality, usually sappy and wide-ringed southern pine, scant 3 by 6, were laid throughout the building, with the ends resting directly on the girders, with about a 6-in. bearing. The ceiling, girders and posts were all encased in plaster board, leaving a narrow air space between the board and timbers.

This combination of circumstances—low quality timber, high moisture content, and plaster board covering—caused the timber to rot rapidly, particularly at the bearings of the laminated floor on the girders.

At the time the writer inspected the building the timbers had reached an air-dry condition for a heated building and the fungus was apparently dead, except on the top (seventh) floor. During the time in which the timbers were drying to this point, however, the fungus had ample opportunity to produce serious decay in many of the timbers which resulted in the removal of a considerable number.

HOW TO CONTROL DECAY.

This phase of the subject can best be discussed under two main heads: (1) prevention; (2) eradication.

Prevention of Infection.—The possibility that timber may reach the consumer with infection already in it is by no means remote. Many lumber yards are in a highly unsanitary condition as regards the presence of destructive fungi. For this reason the material should be carefully inspected and all pieces bearing incipient rot rejected. Likewise, it may prove advisable to inspect the yard where the purchase is made.

Upon delivery of the material it should not be thrown about on the ground, but should carefully be placed on skids and kept dry. The soil is often a prolific source of infection.

Such timbers as are to be placed in situations favourable to decay should either be select grades of naturally durable stock or else treated with a good wood preservative. Neither non-durable timber nor sapwood is objectionable when used in a dry condition and kept dry. Hence, every effort should be made during construction to keep moisture away from the timbers, and especially the joints.

Moist timbers should never be cased in, nor should timber of any sort be embedded in concrete or brick walls without boxing.

In all cases thorough ventilation of moist, stagnant basements should be provided.

ERADICATION OF INFECTIONS.

Whenever timbers begin to fail, the need of a thorough inspection of the building is indicated. If poor ventilation is the cause, the building should be opened up to secure rapid drying of the timbers. At the same time tests should be made to determine whether the wood contains living fungus. It is also important to know what species the fungus is, as further control measures may hinge on its identity. For instance, the true dry-rot fungus, being a low-temperature organism, can be controlled by the application of heat, while such a procedure would be useless with most other species. Some fungi may also prove susceptible to a certain amount of drying, where others would not.

Where serious and active decay exists, without the exact method of control being indicated, the timbers should be carefully removed and replaced with select durable stock or with lower grade material treated with antiseptics. Likewise all incipient infection which appears in timbers which it is not considered necessary to remove should be given two or three applications of a wood preservative. Either a hot 3 to 4 per cent. water solution of sodium fluoride or a cold 1 per cent. alcoholic solution of mercuric chloride is well suited to interior timbers. Exterior timbers, where odour and colour are not objectionable, can be satisfactorily treated with a good grade of hot coal tar creosote.

COLOURING CONCRETE.

Permanency is an important consideration for this work, and a number of the best colours suitable are enumerated in a bulletin on cement stucco issued by the Association of American Portland Cement Manufacturers. The quantities recommended will give a light shade of the desired colour. About twice as large a quantity is necessary for a medium dark shade of the same colour.

Mix the colouring matter thoroughly with the sand till a uniform colour results, and then mix with the cement. Blacks are safe colours, as a rule, but it is better to avoid experiments with cheap blacks. The carbon blacks are preferable to lampblacks, because they do not have the same tendency to float to the top during mixing. Ultramarine blue, if of good quality, will hold its colour for a number of years, and generally possesses the virtue of fading out evenly. It cannot be classed as a permanent colour, as is black, brown, or ochre.

Green is an unsatisfactory colour to experiment with. Commercially there is no green cement colour on the market that will not fade when mixed with cement and exposed to light and weather.

Colours required.	Pigments used.	Pounds of Pigment for each Bag of Cement.
Greys, blue-black and black	Lampblack, Carbon Black, Black Oxide or Manganese	1
Blue shade	Ultramarine Blue	5
Brownish-red to dull brick red	Red Oxide or Iron	5
Bright red to vermillion	Mineral Turkey Red	5
Red sandstone to purplish-red	Indian Red	5
Brown to reddish-brown	Metallic Brown, Oxide	5
Buff, colonial tint, and yellow	Yellow Ochre	5

TRADE NOTES.

Boyle's latest patent "Air-Pump" Ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, have been employed by Messrs. The Pennycook Patent Glazing and Engineering Co., Ltd., 11, West Regent Street, Glasgow.

Bricklayers in the Cheshire district are to get from Monday last 1s. 1d. per hour, the highest wage ever paid them.

Mrs. J. A. Bright has presented to the Rochdale Museum an excellent bronze statuette of Perseus and Andromeda by a French sculptor.

OBITUARY.

We regret to announce the sudden death of Mr. T. E. Pryce, A.R.I.B.A., from heart trouble, at Llangadfan, Montgomeryshire, on May 27. He was an active member of the A.A., serving there as hon. secretary, and then as a vice-president, through the years 1885-90. Later on at the Institute he rendered service on the Practice Committee in the years 1904-1909. Thomas Edward Pryce was born in December, 1854, at Welshpool, Montgomeryshire, where his boyhood was spent until his entering University College School, London. He was articled to Mr. Edward Power, District Surveyor for Walbrook, E.C., and worked as an assistant in the offices of Messrs. Giles and Gough, Mr. J. T. Wimperis, and others, and lastly as chief assistant to Mr. Joseph Peacock, of Bloomsbury Square. Meanwhile, he had entered the Architectural School of the Royal Academy, where, in 1880, he was awarded the Silver Medal for Measured Drawings, the subject being Gibbs's Church of St. Mary-le-Strand. He became an Associate of the Institute in 1881. He practised first in Argyll Place, W., then in Bedford Row, and lastly in Gray's Inn Square. Amongst his works may be mentioned alterations and additions to Ifield Manor, Sussex; the Church House, Welshpool, and Thorney Court, Kensington Road, W., a large group of flats, for the Royal Exchange Assurance. He was also mainly responsible for the ranges of stabling and other outbuildings at Wickham Hall, Kent. Of his designs shown at the Academy Exhibitions that for Barmouth Parish Church was the most important, although not one selected for execution. Other exhibits comprised various drawings of old timbered-houses of Montgomeryshire, notably Trewern Hall, Pertheyrin, old Llandinan Hall, and Lymore Hall.

Second Lieutenant Leonard Tysoe, news of whose death at the front has been received by Mr. H. Mair, the borough surveyor for Hammersmith, was lately assistant surveyor to the borough. Obtaining a commission three months ago, he went to the front after a brief training, and was attached to a Labour Battalion. He was instantly killed in his dug-out by a shell early in the morning of May 31. Lieutenant Tysoe, who was educated at Worcester, and articled later to the borough engineer of Oxford, was a member of the Society of Municipal and County Engineers, and, as his late chief, Mr. Mair, states, was not only a most capable and efficient municipal officer, but will be affectionately remembered by his late colleagues for his unfailing, and always unassuming, courtesy and kindness. He was held in great esteem by the members of the council, who had a high opinion of his work and capabilities. He leaves a young widow and an infant son, born only a month ago.

We regret to record the death of Hamilton Willoughby, in his twenty-seventh year, the only son of Mr. G. H. Willoughby, F.R.I.B.A., of National Buildings, Manchester. The deceased was chief officer of s.s. "Ava," torpedoed at sea recently, but date of the event unknown.

The military authorities have decided to appeal against the exemption given to Mr. Epstein, and the matter will, therefore, come up again for consideration on its merits.

The Hyderabad Archæological Society have decided that a Gold Medal be instituted to commemorate the memory of Sir Alexander Pinhey, K.C.S.I., C.I.E., the Founder and first president of the society.

Where the western division of the East-West Transcontinental Railway of Australia crosses the Nullabor Plain there is a section of 330 miles of absolute straight line. So far as can be ascertained this is the longest length of straight line on any railway in the world.

The Highways Committee of the L.C.C. recommends the appointment, as development superintendent of the tramways, at a salary of £800 a year, of Mr. Theodore Eastaway Thomas, commercial superintendent of the Metropolitan District Railway Company, the London General Omnibus Company, and allied companies.

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Our Office Table.

There is an interesting and well illustrated article in the "April Town Planning Review" by Mr. W. H. McClean, M.I.C.E., giving a good summary of Lord Kitchener's Report on the work done in Egypt, published in 1913, and other official records, and published papers. Mr. McClean it will be remembered read a paper at the R.I.B.A., Conference in London in 1910. Other useful papers are "The Approach to St. Peter's, Rome," by Mr. Lionel Budden, M.A., A.R.I.B.A., on "The Dudley Town Planning Competition," on the three Devonshire towns, "Plymouth, Devonport and Stonehouse," by Mr. A. E. Richardson, F.R.I.B.A., and on "Town Planning in London after the War," by Mr. S. D. Adshead, M.A., which is mainly technical.

The University of London is about to institute a B.Sc. degree in estate management, and doubtless many architect surveyors who manage large estates will readily avail themselves of the opportunity to add the designation to their titles. All of us will be interested in the scope and character of the necessary examinations and the qualifications of the examiners. The University of London has, it will be admitted by all, a well deserved reputation for reality in such matters, and a London degree of any sort is a hall-mark of ability equalled by few stamped by other educational or other institutions.

"The Housing Problem" was the "Reconstruction Talk" before the members of the Liverpool Rotary Club last Thursday. The speaker was Mr. T. Howarth, of Rochdale, an authority on building matters, and holding a prominent position in the trade. He emphasised the present need for preparing schemes to be put into operation after the war, and among the points he suggested should be taken into consideration included town planning, options on land with a view to it being leased out to builders, a wise and determined attempt to secure the provision of main arterial roads linking up towns and the country, and the revision of building by-laws. Pressure, he urged, should be brought to bear on county councils and owners of country estates to deal with the housing problem in rural areas, while as to the question of tied cottages, he advocated the payment of a minimum wage which would enable those employed on the land to pay an economic rent. All of them, he said, needed to bend their energies to the common good and realise that the abnormal conditions now prevailing were such that private enterprise for the time being and immediately after the war would be unable to cope with this vast problem. But as private enterprise had in the past supplied 97 per cent. of the housing of this country he had no fear that it would not have its share of the work of reconstruction.

In exercise of the powers conferred upon him by the Defence of the Realm Regulations and in particular by Regulation 9 GG the Minister of Munitions Hereby Orders that notwithstanding his Order of the 9th day of May 1917 taking possession of road stone quarries in the United Kingdom. (1) Regulation 9 GG shall not be applied to any road stone quarry situated outside England and Wales or to any road stone quarry wherever situated producing only gravel and flint used as road stone. (2) The application of Regulation 9 GG shall be postponed until the 15th day of July, 1917.

At the annual meeting of the Edinburgh Academical Club last Thursday Sir J. H. A. Macdonald, .C.B., President of the Club, presiding, said about 1,400 Academicals have been serving the King in the Navy or Army, since the outbreak of war, and of these 185 have been killed in action or are missing. A resolution was unanimously passed, moved by Lord Dundas, LL.D., and seconded by Mr. J. A. Clyde, M.P., Lord Advocate, commending to the generous support of Academicals and other friends of the school a proposal set forth in a statement by the Rector, to appropriately perpetuate the memory of those who have fallen in the war.

The Education Committee of the London County Council has considered the question of the future supply of school pictures. Until about 12 years ago practically all the pictures supplied were black and white plates. This phase of school equipment was, however, revolutionised by the introduction of German coloured auto-lithographs. The production of these auto-lithographs was the result of the deliberation of a school of German artists who realised that a picture consisting of broad outline and colour masses was of greater educational value to children than the conventional black and white reproduction. Not only was the coloured lithograph more acceptable to teachers than the black and white picture, but the price of the former being about one-third of the latter, head teachers were enabled to secure many more pictures than were formerly available. The Council has, in the past, been entirely dependent upon publishers for the type of pictures available for school use. At the time of the outbreak of the war the majority of the pictures requisitioned by teachers were German auto-lithographs. Representations have been made from time to time by publishers urging the Council to purchase British pictures, but the publishers have been indisposed to incur the initial outlay on the production of suitable lithographs without a guarantee from the Council of the purchase of a definite number of copies. As the result of such representations an exhibition was held in 1906 at the Central School of Arts and Crafts at which the German auto-lithographs then on the requisition list were displayed. Publishers, colour printers, and artistic societies were invited to inspect these pictures as examples of what the Council considered suitable in character for school use. Very little resulted, however, so far as British productions were concerned, and the matter, therefore, remained in abeyance. Since the outbreak of war practically no new pictures have been supplied. The Committee is of opinion that the time has now arrived when some definite step should be taken in the direction of indicating the type of picture which is most suitable for school use, not only as to subject, but as to method of production. In this connection it has had before it a proposal made by the Advisory Council of the Central School of Arts and Crafts that experiments should be carried out at the Central School with the above objects in view. It is of opinion that it should be adopted for one year. The experiments will be carried out under the guidance of a Special Advisory Committee consisting of persons competent to advise upon the various educational and technical aspects of the question. It is hoped, by means of these experiments, to produce specimen illustrations which will indicate to publishers what is required educationally. The expenditure for one complete year is estimated at £500 which will cover the remuneration of the artists and other technical staff, and the cost of equipment and materials. The results of the experimental research, with which publishers will be associated, will be made public for the benefit of the trade, and the Council will obtain such pictures as it desires, from publishers, in the usual way. It recommends that a special estimate of expenditure on maintenance account of £250 and an estimate of £250 for the financial year 1918-19, under standing order No. 246, submitted by the Finance Committee in respect of research work in connection with the production of pictures suitable for educational purposes, be approved as estimates of costs, debt, or liability under section 80 (3) of the Local Government Act, 1888.

Large nigger-head boulders up to 8 × 10 ft. were encountered in subway excavation work in Brooklyn, N.Y. The nature of the work made it impracticable to break them up by dynamite blasting. Satisfactory results were obtained by the use of torches of the oil-burning variety which emit a very great heat. When one of these machines was concentrated on one point of the surface of the boulder for ten or fifteen minutes the great heat expanded the rock so much that it split at the seams. The operation was repeated on the smaller pieces until they were reduced to a satisfactory size for handling. The total cost for breaking up a large boulder of the size mentioned was about 60 cents, using two men and the torch, which consumed about one gallon of kerosene oil per hour.

A chimney constructed at Saganoseki, Japan, for use in connection with copper smelting furnaces, is the highest chimney in the world. It is 570 ft. high above the base, 42 ft. 8 in. outside diameter at the bottom, with an inside diameter at the top of 26 ft 3 in. The shell thickness is 29½ in. at the bottom and 7 in. at the top. It is designed to withstand earthquake stresses, the design being checked and approved at the Tokio Imperial University. The reinforced concrete foundation, of monolithic construction, rests on gravel on top of a hill 430 ft. above sea-level. The maximum bearing pressure per square foot under maximum wind conditions is 6,000 lb. per square foot. The foundation is in the form of a truncated cone 17 ft. thick, with a diameter of 95 ft. at the base and 42 ft. at the top. It contains 2,711 cubic yards of concrete, and required thirty days to place, working twenty-four hours a day. The total steel reinforcement in the structure amounts to 530 tons, and consists of plain, round steel bars and square bars of American make. The reinforcement consists in the lower portion of the chimney of pairs of rings of ⅝ in. square bars, spaced 6 in. centre to centre vertically. In the upper portion there are single ⅝ in. rings, spaced 7½ in. centre to centre. The chimney has a reinforced concrete lining to a height of 150 ft. above the top of the foundation. The lining and shell are separated with a 4-in. air space. The Portland cement used was of Japanese manufacture. A reinforced concrete smoke flue extends from the smelter plant to the chimney, a distance of 2,500 ft. up the slope of the hill. For lightning protection there is a copper circle at the top of the chimney, which has seven platinum points extending 4 ft. above the edge of the chimney. From this circle seven cables lead to the base. At a height of 400 ft. from the base a similar copper circle, with four platinum points, is located, with rods down the chimney.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.

It is particularly requested that all drawings and all communications respecting illustrations or literary matter, books for review, etc., should be addressed to the Editor of the BUILDING NEWS, Effingham House, 1, Arundel Street, Strand, W.C.2, and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

When favouring us with drawings or photographs, architects are asked kindly to state how long the building has been erected. It does neither them nor us much good to illustrate buildings which have been some time executed, except under special circumstances.

Telegrams: "Timeserver, Estrand, London."
Telephone: Gerrard 1201.

RECEIVED.—E. H. G.—A., Ltd.—L. and N.—B. S. Co., Ltd.—L. P. A.—C. P. and Co.—A. W. M.—W. H. S. and Son.

A H. G.—Yes.

J. M. M.—Please send.

A. K.—No space to spare.

2ND LIEUT. A.—Sorry, but we have no later address.

H. D.—The figure, of course, is excessive on the face of it, but there may be local circumstances that might explain it, and therefore we hardly care to publish your attack. The other figures you refer to have, we assure you, been very carefully verified.

M. F.—Discoloration in the face of a marble wall may be due to impurities in the mortar, cement or brick used in the construction, which are brought to the surface through capillary attraction. The iron stains in marbles in a wall are probably also due to the ferrous oxide in the mortar, cement or brick used in the construction rather than in the marble itself. A preventive against ferrous iron in the brick or mortar of the back well coming to the surface is a coat of asphalt between the back wall and the stone facing; or, of course, the selection of lime, cement, and brick in which it is certain that ferrous iron is not present.

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LEGAL INTELLIGENCE.

LORD MAYOR OF LONDON'S LIBEL ACTION FAILS.—DUNN V. MACKAY.—The libel action brought by the Lord Mayor of London, Sir William Dunn, against Mr. D. S. Mackay, secretary and general manager of the Greenwich Inlaid Linoleum Co., Ltd., ended with a verdict for the defendant with costs. The action, as we stated last week, was heard before Mr. Justice Darling and a special jury. Counsel stated, in opening the case, that Sir William had claimed a fee of 200 guineas for professional services rendered as a surveyor to the linoleum company, of which he is a director. In submitting the matter to the company's solicitor, the defendant, it was alleged, sent some notes suggesting that Sir William attempted to browbeat another director who objected to payment of the 200 guineas, and that a scene at a directors' meeting was "arranged," possibly with the object of delaying the return of £700, the balance of a £1,000 cheque which Sir William had received to pay the company's insurance premiums. Sir William alleged that this amounted to a libel on himself, and now claimed damages. The jury found that the matters complained of did not constitute a libel; that the statements were true; that Mr. Mackay believed he ought to send all the facts to the firm's solicitor, so that he might give his opinion correctly; and that the defendant was not actuated by malice. Mr. John H. Horton, now chairman of the company, said he asked the defendant to take notes, but did not recollect telling him to put them before the solicitor. Cross-examined, he did not think that Sir William Treloar or Sir William Dunn tried to browbeat him. Of course, he did not think the plaintiff wanted the balance of the £1,000 cheque for his own use. He merely thought it was irregular. After his lordship had entered judgment for the defendant with costs on the verdict given above, counsel for the plaintiff said that if the statement made in the box the previous day by Mr. Mackay that he made no dishonourable charge against Sir William Dunn had been made before, the action would never have been brought.

PROFESSIONAL AND TRADE SOCIETIES.

THE ROYAL INSTITUTE OF THE ARCHITECTS OF IRELAND.—A general meeting of the institute was held at 31, South Frederick Street, Dublin, on the 7th inst. The president, Mr. W. Kaye-Parry, M.A., B.E., occupied the chair; there were also present Messrs. R. O'Brien Smyth, Lucius O'Callaghan, Ralph H. Byrne, P. J. Lynch, R. M. Butler, Edwin Bradbury, Geo. L. O'Connor, A. G. C. Millar and Frederick Hayes, hon. secretary. The president announced that Mr. Louis E. H. Deane had been co-opted on the council to fill the vacancy caused by the resignation of Mr. Allberry. Mr. P. J. Lynch reported that the Committee on Ancient and Historical Buildings had under consideration the proposed removal of portions of old St. Nicholas Church (built 1707) in Nicholas Street. He had seen the city engineer, and obtained permission to have an accurate drawing of the portion which remains prepared and a photograph taken as records. It was the opinion of the committee that no further action was necessary. The following resolution was passed:—"That the Royal Institute of the Architects of Ireland considers that the prolonged delay in announcing the result of the competition for designs for the proposed University buildings of the National University of Ireland is most unfair to the competing architects. The designs were submitted in June, 1916. A memorial signed by a great number of competitors asking for a short extension of time was refused; although, owing to the disturbances during Easter of last year, the work of many architects was seriously interfered with for a considerable time. The Royal Institute of the Architects of Ireland would urge that the Senate should announce the result of the competition without further delay."

A window in memory of Lieutenant Brian Mortimer, Durham Light Infantry, which has been put into St. Mary's Church, Finedon, Northamptonshire, was unveiled and dedicated on the 13th inst.

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TENDERS.

***** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.**

BERKS.—For repairs to the bridge over the river Loddon, on the Reading and Wokingham main road, for the Berkshire County Council:—
Collier and Catley, Reading, on a schedule of prices (accepted). Estimated cost £600 0 0

BRADFORD.—For alterations to premises at the Cartwright Memorial Hall, for the Corporation Libraries, Art Gallery and Museum Committee:—
Michael Booth and Sons (accepted) £413 15 0

BROMSGROVE.—For erecting new chimney shaft at the workhouse, for the Guardians:—
A. J. Amess (accepted) .. £94 16 0

CHELMSFORD.—For the provision of sanitary accommodation at the public baths in Waterloo Lane, Chelmsford, for the Town Council. Mr. P. T. Harrison, A.M.I.C.E., borough engineer:—
H. Potter, Chelmsford* £103 0 0
G. I. Bedingfield, Chelmsford .. 111 0 0
T. J. Bailey, Chelmsford .. 119 0 0
* Accepted.

HORSHAM.—For extending the Warnham sewage outfall works, for the Horsham Rural District Council:—
A. E. Ayling (accepted) .. £445 13 2

HOVE.—For painting and distempering at the public baths, Livingstone Road, for the Town Council:—
A. W. Leney (recommended for acceptance) £40 0 0

LONDON, N.—For repairs to schools, for the Edmonton Education Committee.
Accepted tenders:—Brown and Son, Lower Latymer School, £32 16s.; A. Monk, Eldon Road School £600, Croyland Road School £575.

LONDON.—For works at various institutions, for the Metropolitan Asylums Board:—
W. Griffiths and Co., Ltd., Hamilton House, Bishopsgate, E.C... 905 0 0
W. Manders, Leyton Green, Leyton, Essex 879 6 6
T. Adams, Wood Green, N. .. 789 16 6
D. T. Jackson, 106, Ripple Road, Barking* £683 0 0
* Accepted. Acting engineer-in-chief's estimate, £565.

PONTSARN.—For erection of a covered way at the Sanatorium, Pontsarn, near Merthyr Tydfil, for the Guardians of Merthyr Tydfil Union. Mr. T. Roderick, Ashbrook House, Aberdare, Architect:—
J. T. James, 2, Brynmorlais, Penydarren, Merthyr Tydfil (accepted) £233 0 0

RATHDOWN (IRELAND).—For repairing ceiling in the Board-room, for the Rathdown Board of Guardians:—
J. Plunkett and Son, Kingstown* £34 10 0
M. O'Brien, Summerhill, Kingstown 38 10 0
* Accepted.

The business and factory in England of the German firm of Carl Zeiss have passed into British hands, the concern having been purchased by Messrs. Ross, Limited, manufacturers of optical instruments in this country since 1830.

Raeburn's splendid whole-length life-size portrait of Francis, the twelfth and last Laird of Macnab, will be sold at Christie's early next month with other pictures which belonged to the Hon. Mrs. Baillie-Hamilton, of Langton, Duns, N.B., and are now being sold by order of Major M. G. Gavin. The portrait of the Macnab was painted about 1796, and shows him in the uniform of the Breadalbane Fencibles. It was exhibited at Rome in 1911, and at the Grafton Galleries for some time on its return. A portion of the late Sir Hugh Lane's pictures will be sold the same day.

LIST OF TENDERS OPEN.

BUILDINGS.

June 25.—Alterations and Additions at Togo House, Dempster Street, Greenock.—For the Corporation.—Town Clerk, Municipal Buildings, Greenock.

June 26.—The Cheshunt Urban District Council invite tenders from firms specialising in the construction of buildings of a temporary nature for the erection of a smallpox hospital, comprising ward block, administration block, and laundry and mortuary block.—J. E. Sharpe, Engineer and Surveyor, Manor House, Cheshunt.

June 30.—Alterations, additions, repairs, and renovations, etc., at Council schools during the summer vacation, 1917.—For the General Education Committee of the Wilts County Council.—J. G. Powell, County Surveyor, Trowbridge.

June 30.—Extensions to the isolation hospital (corrugated iron) at Immingham, and painting the whole of the sides, roofs and external woodwork of existing building and new block.—For the Grimsby Rural District Council.—The Clerk to the Council.

ENGINEERING.

June 22.—Design and erection of reinforced concrete coal bunkers and skeleton structure.—For the Wolverhampton Corporation.—Town Clerk's Office, Town Hall, Wolverhampton.

June 25.—The completion of a dug-out well at Taevin, in the Oranmore district, in accordance with a specification prepared by Mr. E. O'Malley, B.E., Mounterowen, Maam, a copy of which may be obtained on application to the Clerk.—For the Galway Rural District Council.—R. F. Mullery, Clerk, Workhouse, Galway.

June 26.—Resetting a Lancashire boiler at their sewage outfall works.—For the Tottenham and Wood Green Joint Drainage Committee.—R. C. Graves, Clerk, Town Hall, Tottenham.

PAINTING.

June 25.—Painting the Two Gasholders at the Gasworks, the Council supplying all paint to be used.—For the Shoeburyness Urban District Council.—F. Gregson, Clerk.

June 27.—Painting the following stations:—Montgomery, Moat Lane, Bow Street, Llwyngwril, Arthog, Pensarn, Harlech, Portmadoc.—for the Cambrian Railways Co.—G. C. McDonald, Chief Engineer, Cambrian Railways, Oswestry.

June 27.—External painting and repairs and internal distempering and cleaning at the Darenth Industrial Colony, Dartford, Kent.—For the Metropolitan Asylums Board.—D. Mann, Clerk.

July 6.—External painting of the Goodwick (Pembroke) Council School and the internal colouring of the adjoining dining-room buildings.—For the Pembrokeshire Education Authority.—The Clerk to the Education Committee, County Education Offices, Haverfordwest.

July 11.—Painting the following bridges: Crook, Daddryshield Wear, Daddryshield No. 2, High Team, Ireshopeburn, Killhope Foot, Killhope Mill, Low Team, Nancy Pasture Foot, Newton Cap, Parkhouse Pasture, Penshaw, St. Helens (Auckland), Westgate, Wearhead and Wolsingham.—For the Durham County Council.—A. E. Brookes, County Surveyor.

SANITARY.

June 25.—Construction of a storm-water relief sewer, about 350 yards 9-in. pipe, together with two silencers.—For the Kempston, Bedfordshire, Urban District Council.—H. N. Tebbs, Clerk.

ROADS AND STREETS.

June 29.—Works in connection with the reconstruction of the main road between Cannock and Hednesford.—For the Cannock Urban District Council.—Chairman of the Urban District Council, Council Offices, Cannock.

At the annual conference of the National Union of Railwaymen on Monday the President, Mr. Bellamy, said that there were strong reasons why the Government should never again lose its control of the railways. He thought the best method would be for the Government to acquire and work the railways, but it should be made clear that no system, whether nationalisation or control, would be acceptable unless the railwaymen were given a share in the management.

The Scottish National Housing and Town Planning Council met in the City Chambers, Edinburgh, on Friday, for the purpose of considering the reply from the Local Government Board to the memorial recently presented on behalf of Scottish local authorities carrying on town-planning schemes. Complaint was expressed at the prolonged delay of the central authority in dealing with these schemes, and it was considered that the reply which had been received and the proposals of the Local Government Board in the matter were unsatisfactory, and did not hold out expectation of despatch in the promotion of town-planning in the country.

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THE BUILDING NEWS

AND ENGINEERING JOURNAL.

Effingham House, Strand, W.C.2.

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OUR ILLUSTRATIONS.

Victoria and Albert Museum, South Kensington. Sculpture in the archivolt of the main entrance. Mr. Alfred Drury, R.A., Sculptor. Sir Aston Webb, K.C.V.O., C.B., R.A., Architect. Illustrated by detail photographs now at the Royal Academy.

Cathedral of St. Giles, Edinburgh. Interior looking east, from an etching by Capt. A. E. Borthwick, A.R.E. (Royal Academy Exhibition of Graphic Art, 1917).

The Problem of the Small Dwelling and Its Solution. Two sheets of typical plans, by Mr. Robert Thomson, Architect.

Currente Calamo.

We very earnestly commend the aims and objects of the newly-formed Homestead Association to all concerned—and who is not?—in the future of our discharged convalescent soldiers. It is working, with good help and fair prospects of success, to provide homesteads for discharged convalescent officers and men throughout the country where they may live and train after they have passed out of the scope of medical treatment; and, next, to acquire land and houses, or build houses for disabled officers and men the recovery of whose health may be facilitated by cheerful surroundings and home comforts, combined with the employment of their physical and mental abilities in agricultural work, in trades and professions. In the case of all such the greatest stimulant to recovery is the prospect of a useful future. Too often apparent convalescence is illusive, and is followed by a relapse which is not seldom aggravated by despair as regards the future; while in all the provision of occupation suitable to their condition is the best auxiliary to medical aid. Many may say why does the Government leave this work to private initiative? Government is bound to do the work, and will, but at present its energies are taxed to the utmost, and it is the duty of the individual citizen whose life and possessions our disabled heroes have suffered to protect to make good present needs; and after all, he is likely to be better seconded in the discharge of his obligation by such an organisation as that for which we plead. An inaugural meeting of the scheme will shortly be held, and meanwhile Sergeant-Major D. Spencer, of the Artists' Rifles, will be glad to hear from all sympathisers at the offices of the Association at 17, Craven Street, Strand, which is the headquarters of another patriotic organisation for the furtherance and support of British interests, which all present and previous members of that famous corps belong to, or should belong.

The income-tax began as a war tax, and it is to-day justifying its origin with a vengeance. The first Act was in 1806, and there have been statutes passed about it ever since; while some thousands of decisions have accumulated, showing the efforts of the Courts to understand and explain the law. But there was still one practical point outstanding which had never been raised in litigation before, though settled long ago on a common-sense business basis. This was as to the duty of a tenant who deducts the property tax he has paid from his current rent to produce his receipt to the landlord. So in the recent case of "The North London and General Property Company, Ltd., *v.* Ernest F. Moy, Ltd.," this great matter came before the High Court in these crowded days of war and worry. The plaintiffs sued for a quarter's rent due from defendants in March last. The only defence was that as the tenant had in February paid the property tax—which is, in fact, income-tax under Schedule A—at 5s. in the £, and which he was entitled to deduct, this was, in effect, a payment of the rent of the same sum. The whole point was that defendants refused to take or send their official receipt to the plaintiffs, arguing that it was for them to come to his place and see it. There was no clear clause as to this in any of the many Income-tax Acts, nor was there a decided authority. But the official receipt says that the landlord must allow the tax as a deduction from his rent under a penalty of £50, and then goes on to add that the receipt for such payment "should be" produced. Two learned counsel kept it up as well as they could, and then Mr. Justice Low, caustically remarking that it was interesting to find even now some people with so much time and money on their hands to raise such a point, cut in with a clear stroke of common sense. The law was that a tenant should take or send his rent to the landlord. If the tax paid and to be deducted was equal to this rent, then he must take or send his receipt as proof of such payment, which, indeed, has long been the usual way. So there was judgment for plaintiffs, with costs, and the defendants will now wonder whether their precious point was worth the money.

The case of "Bennett v. Sprague," of which a report is given on another page, raises points of very considerable interest to architects in connection with the R.I.B.A. scale of charges, particularly as regards Clause 5, which Mr. William Woodward quotes in full in his letter, which will also be found in this issue. It will be noted that Mr. William Woodward himself gave evidence in the case, as also did six other architects, and, of those, three supported the plaintiff and three the defendant, the main point of difference being whether, under the circumstances, the defendant architect was entitled to the 2½ per cent. fixed by Clause 5. We all know, of course, that the R.I.B.A. schedule is under revision, and most of us will agree that it needs it. But we are bound to face the fact that, even if it is practicable to arrive at unanimity of opinion as to what the clause *should* mean, it is probably in the nature of things impossible so to word it as to render it difficult for conflicting professional witnesses to agree as to whether in individual actions at law the particular claim advanced is justified by the facts as elicited in evidence. It is certainly regrettable that eminent members of the same profession should "assist the Court" by giving varying opinions in reference to a rule by which they are all bound; and no one will dispute the point raised by the Official Referee, viz., that the specific requirements of the clause must be strictly complied with. The aim now should be so to word Clause 5 as to define those requirements and render cavil impossible.

Mr. D. Everett Waid, president of the New York State Board for Registration of Architects, calls attention to the fact that the New York State law regulating the practice of architecture has recently been amended. One of the amendments extends the exemption period whereby certificates of registration may be issued to architects who were in practice previous to the enactment of the original Registration Act—namely, April 28, 1915. Any architects who were in practice in New York State previous to that date may now secure certificates, provided their applications are filed before January 1, 1918, and provided such applications are approved by the Board of Examiners. One of the amendments just enacted reads as follows:—"Any architect who has lawfully practised architecture for a period of more than ten years without the State shall be required to take only a practical examination, which shall be of the nature to be determined by the State board of

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examiners and registration of architects." Another amendment is as follows:—"But this article shall not be construed to prevent persons other than architects from filing applications for building permits or obtaining such permits."

The destruction by fire of the clock tower of the City Hall, New York, cheerily remarks the "Scientific American," so far from being a disaster is rather to be regarded as presenting an opportunity for greatly improving the beauty and dignity of that famous historical landmark. The city authorities did not follow the plans of the architect of the building, and the clock tower, as built, did not compare in architectural excellence with the cupola as originally planned. The original design, both as regards its details and its total height, blended more harmoniously with the exquisite lines and proportions of the City Hall than the clock tower with which New Yorkers are all so familiar. We understand that it is proposed, in rebuilding, to revert to the original design, and we sincerely hope that this will be done. If so, timber should be discarded altogether, and the cupola should be constructed in marble, preferably taken from the same quarry as the stone of which the City Hall is built. Fortunately, the location of the cupola is such that its north and south walls rest upon the interior heavy walls and columns of the building, and if steel girders were laid between these supports to take the load of the east and west walls of the cupola, a satisfactory foundation would be provided. "Here," says our contemporary, "is an opportunity for the City Fathers to put through a work of architectural embellishment for which future generations will rise up and call them blessed."

The installation of Mr. P. H. Palmer, M.Inst.,C.E., as President of the Institution of Municipal and County Engineers will take place at the forty-fourth annual general meeting of that body to be held at Hastings to-morrow and the two following days. The number of papers to be read is exceptionally small—only four being presented. At the first day's conference the subject of public abattoirs will be introduced in a paper by Mr. H. A. Brown, of Weston-super-Mare; and Mr. H. T. Wakelam, the county engineer of Middlesex, will deal with "Extraordinary Traffic and Excessive Weights on Highways." On the second day Mr. E. Willis, of Chiswick, will present a paper on "Examinations," and Mr. E. J. Goodacre, of Shrewsbury, will speak on "Dry Rot." The meeting will also include the usual social functions (with the exception of the annual dinner), and visits to works and places of interest. The institution is again fortunate in its choice of a president, for Mr. Palmer not only has a long and honourable record in his profession, but also has former presidential experience, having presided over the Institution of Water Engineers in 1905-6.

Messrs. Frank Jolly and James, of 105, Leadenhall Street, announce that from and after June 25 their City offices have been transferred to 71, Leadenhall Street, E.C.3.

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION.

VI.

By ROBERT THOMSON.

(WITH ILLUSTRATIONS.)

If the draughtsman referred to in last week's issue has avoided the evils of the official model plans, and at the same time faithfully met the requirements hereinbefore set forth, the plan which he has evolved will show a dwelling in which the whole of the accommodation is arranged on the one-floor level. It will, in short, be seen that he has produced the plan of a bungalow, and the well-planned bungalow, according to the testimony of those who have had the rare good fortune to occupy one, is the ideal type of dwelling for all, and in particular the much-longed-for ideal of every capable housewife. Unfortunately, however, a substantially constructed, perfectly equipped bungalow does not offer the utmost economic value possible of attainment, and is not, therefore, available as a solution of the great problem of the small dwelling.

A little consideration will show why this is so. In the first place, the same provision which has to be made for protecting the occupants of the bungalow from the emanations of the site would suffice without further outlay for a two-story building which would entail only a slight addition to the cost of the foundations required for the bungalow. In the second place, the roof that effectively protects the bungalow would, without an extra penny of cost, protect equally well two such dwellings if the one were superimposed upon the other. In the third place, the proportion of street with its main sewer, its gas, electric, and water mains and drainage, gas, electric and water branches and connections up to a point would cost no more for two such single-flatted dwellings than they would for the single bungalow. In the fourth place, if the reader will refer back to Figs. 15 and 16 on sheet II., he will see that for a two-flatted cottage of the Government's 8-ft. ceiling type, the total wall height is 22 ft. 6 ins., and that only 8 ft. 9 ins. of this belongs to the upper story, as against the balance of 13 ft. 9 ins. for the lower. The walling of the top story therefore costs substantially less. In the fifth place, the walling which is by present methods employed in the construction of a substantial bungalow can now be more economically utilised in the construction of single-flatted dwellings of the bungalow type when these are arranged in buildings two stories high and constructed in accordance with my patented method described a few lines ahead.

As an example of what is meant by these statements, take the plan of the small bungalow of only 650 square feet roofted area, which is shown in Fig. 8, sheet I., and suppose for the present argument that another exactly like it is arranged directly over it, it will at once be seen that the only requirement which would have to be met would be some means of reaching the upper dwelling. The local lamplighter's ladder, hooked on to the circular front of the porch floor, would be one means of providing access, and I must admit that it would be very little less inconvenient to use than some of the creaking contraptions miscalled stairs with which the two-flatted type of small dwelling is far too often equipped. As, however, only one of each pair of the single-flatted type of two-story cottages requires a stair there would be no need to deprive the lamplighter of his ladder, because the cost of the two stairs which are required in each pair of two-flatted cottages would go a long way towards providing the single decent stair with which the two-story pair should, and easily can, be economically equipped.

The next step in the direction of securing further economy is to bring two of these single-flatted two-story pairs together. This would give semi-detached fours instead of the usual semi-detached pairs with which all of us are already familiar. It may perhaps have been already noticed by the careful reader that in the present series of articles defects are not merely mentioned and passed by, but are faced and eliminated, and that an advantage once gained is never relinquished. By this means advance is made step by step, the good features being improved and the bad discarded. The same method of procedure holds good, and is applied in regard to the bungalow type of plan, and although it is not economically possible to give every family a bungalow, it is easily possible to give every second family one by providing every other family with an upstairs single-flatted dwelling which in the opinion of those who can speak from experience of both is indistinguishable from the true bungalow, and is even preferred by some on account of the greater extent of view which its greater elevation enables it to offer. One of the very many advantages of the bungalow to which I desire to direct very special attention is the facility with which the sick or ailing member of the family can be tended.

For example, the careful attention which can be so easily given in the single-flatted dwelling would entail much hardship on the mother who gave similar attention to the patient occupying one of the upstairs apartments of a two-flatted dwelling. In the latter the housework would have to suffer, but as there are, as a rule, other members of the family who require attention, the consequence generally is that both patient and housework suffer and the mother is harassed in trying to meet the requirements of both.

Another of the many advantages of the single-flatted dwelling is at once discovered when the mother, with a young family, is herself taken ill. Although too unwell to move about, she can as a rule direct her little ones to do such household services as will prevent chaos supervening in the home. In this way the presence of perhaps an undesirable neighbour is rendered unnecessary, and the children begin to know how helpful they can become, and are proud of it. In the two-flatted dwelling the case of the ailing mother is very different. Often she comes downstairs at great risk and has to suffer for her desire to help, and when she suffers all the rest of the household cannot take her place. I have examined many plans of two-flatted dwellings, including the whole of the nation's model ones, with the object of ascertaining if by any possibility the housewife when indisposed could have her load of responsibility eased by the convenient arrangement of the dwelling, but so far have failed to find one in which there is the slightest provision for facilitating the work of those who have the care of the sick. In contradistinction to such dwellings which can never be made comfortable homes the possibilities of the single-flatted type are overwhelmingly great.

What the comforts of a well-planned, perfectly equipped bungalow would mean to the housewife can only be fully realised by those who have actually lived in such dwellings. Hundreds of thousands of women live a life of unending drudgery merely because houses have been so badly planned that it is impossible for any

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human being to cope with the work they involve with any reasonable output of energy. Many an industrious woman has been turned into a slattern by a badly planned house.

In the competently planned, efficiently equipped single-flatted type of dwelling the housewife is enabled with the least possible expenditure of labour to effectively compass her innumerable tasks with such success that she can with joy contemplate the work of her hands.

As none of the defects of existing types of dwellings are criticised in these articles unless I have made certain that they can be economically avoided, the reader may rest assured that somewhere in the collection of illustrations he will find the remedy for all defects referred to.

The plans on Sheet X. of this week's issue complete the series of examples which have been prepared in order to provide in the most elementary form the counterpart of each of the eighteen plans for which the ratio is given on Sheets II. and III. of the present series. These elementary plans of single-flatted dwellings include examples showing apartments which exactly conform to the sizes set forth by the Advisory Committee in paragraphs 35 and 36 of their report. Among them are plans showing dwellings embodying apartments the sizes of which are in exact accordance with the committee's "Irreducible," their "Desirable" and their "Parlour" standard requirements, and the pairs, fours, sixes and terraces dealt with on Sheet III. are all represented.

All the plans on Sheets II. to X. inclusive are drawn to the one common standard. For example, all are shown with 11-in. cavity walls for the main building, 9-in. solid walls for any wing or outbuilding, while all have 4½-in. partitions. The volume of houseroom in each is in every case based on a ceiling height of 8 ft.

These precautions enable the value of the skill shown in the planning of each to be clearly brought out. A glance at the figures appended to each of the plans in the series shows that the gain in houseroom is progressive and substantial. But these are, after all, merely elementary examples which I found it imperatively necessary to devise in order that the "experts," who turn out the rudimentary type of plans shown in Figs. 1, 6, and 7 of Sheet I., and those on Sheets II. and VIII. may have something so simple to compare with their own that the results of the comparison cannot possibly be misunderstood by them. Letters which I have received show the absolute necessity for this.

Before proceeding to discuss another stage in the educational series it may be well to briefly summarise the characteristic features of the three groups of plans already commented upon. The first of these, comprising Figs. 1, 6, and 7 of Sheet I., Figs. 12, 14, and 17 of Sheet II., and Figs. 50, 51, 52, and 53 of Sheet VIII., all belong to the two official collections of model plans. These rudimentary examples show the utmost economic value which their authors were able to give with the materials employed, which, be it noted, were all of their own choosing.

The plans on Sheet III. are based on the Departmental and Advisory Committee's requirements, and show the limitations imposed by the two-flatted type of dwelling when the officially standardised sizes of apartments are employed, while the plans on Sheets IV., V., VI., IX., and X. show the paralysing effect, both on planning and construction, which the adoption of the committee's standardised sizes of apartments imposes. Although the plans on these five sheets go a very long way ahead of the corresponding ones on Sheet III., which leaves the official plans hopelessly marooned behind it, they themselves do not cover one-third of the way yet to be traversed ere the perfected dwelling is reached. They certainly show the utmost economic value which it is possible to give with the single-flatted type of dwelling when the official sizes of apartments are employed; but the results thus obtained fall very far short of what the materials employed in their construction are capable of giving when they are competently utilised. There is, for example, much to be gained by improvements in construction.

Before passing to my further remarks, the reader should carefully study the Advisory Committee's paragraph on "Planning." He will then see how the nominees of those whom Dr. Saleeby in his article on Imperial Eugenics describes as "glass-eyed politicians aping statesmanship" have fooled themselves into the belief that they are experts capable of competently advising the nation as to the planning of its dwellings.

Constructionally, the whole of the brick-built dwellings erected to the Government's model plans would belong to the "jerry" order, because the walls of the lower story in all of them are only a single-brick thick, either built solid, or so as to give with a 2-in. cavity, walls which are certainly better from the health point of view, although somewhat less substantial than the solid 9-in. thick wall. In order to be as substantial as a single-story cottage with 9-in. solid brick walls, the two-story type should have its lower story walls a brick and a-half instead of only a single-brick thick; and every architect who is free to use his own judgment and is unhampered by questions of cost would insist on the thicker walling. Some by-laws, indeed, require this. Two-flatted cottages having 9-in. solid walls are not merely deficient in strength, they are also greatly inferior in durability, because when the walls are only a single-brick thick the ends of the upper floor joists and the wall plates upon which they rest are not always sufficiently protected from weather influences and are liable to premature decay owing to access of damp. The "life" of such houses is relatively very short, and as defective planning always gives buildings which are both costly to build and maintain the combination of inferior construction and inefficient planning, entails a very uneconomical as well as a very unsatisfactory type of dwelling.

It is impossible, of course, while adhering to existing methods of construction, to adequately increase the stability of such dwellings without increasing the thickness of the lower story walling. This, however, not only means adding seriously to the cost of the structure, but unless the house is correspondingly enlarged it entails a substantial reduction on the houseroom and a serious curtailment of the already inadequate floor space; consequently the people and their children have not only to suffer in health, comfort, and convenience, but have to pay for the extra cost in extra rent, because official "experts," following faithfully in the footsteps of their very remote ancestors, have not sought out means of counteracting such very grave drawbacks as adherence to existing methods of construction inevitably entail upon the humble occupants of the official type of small dwelling.

It is perhaps fortunate for the occupants of such dwellings that it is now essential in cottage construction to utilise home products such as cement in order to as far as possible avoid either having to use home-grown timber or to send money out of the country for the purchase of foreign timber or to employ shipping for its transportation. This contingency was early foreseen in the course of my investigations, and it was in my efforts to effectively meet it that largely helped me to completely solve the problem of the small dwelling. The possibilities in the direction of using concrete in cottage construction can perhaps be both most easily explained and most readily understood by readers if I employ diagramatic drawings for the purpose of explaining my method of construction. These are given fully on the accompanying Sheet XI.

In two-story cottages of existing types the walling and partitions and the roof and floor structures of the upper story, together with their superloads, are wholly carried by the walls and partitions of the lower story, and since neither the chimney breasts nor the party walls are utilised as supports for the floor or roof structures, it is upon these lower walls, which are usually of the slimmest possible construction in small dwellings, that the entire building structure is dependent for its stability. As this method of construction calls for thicker walls and partitions than would be required if no such carrying had to be done, it thus entails the use of extra materials which not only involve extra cost, but, in addition, take up space which is badly needed as houseroom. The present invention was designed in order to overcome these drawbacks and to facilitate the use of concrete as a structural material. It consists in so supporting the floor and roof structures of the upper story by means of the chimney breasts that the load on the outer walls and partitions of the lower story is so greatly reduced that with but little additional support arranged in the line of the outer wall, these lower story walls and partitions can be freed, not only from the necessity of carrying any portion either of the structural or of the super load of the upper story, but the upper floor structure is enabled to economically carry the outer walls and partitions of that story instead of these, and the roof structure being carried by the walls and partitions of the lower story as is the case in existing practice. Stated more specifically, so as to apply directly to the health promoting class of dwelling, which I have evolved and patented, the present invention consists in a method of constructing single-flatted cottage dwellings arranged either in pairs or in groups of four disposed in buildings two stories high, such method consisting in (1) erecting within the central area of each superimposed pair of the proposed dwellings two chimney breasts so disposed that they form the main supports of the floor of the upper story, and of the roof also if desired; (2) erecting within the outer roofed area of each pair of such dwellings such additional supports as may be required to carry the remaining minor portion of the floor structure and also of the roof structure when so desired; (3) forming, resting upon such chimney breasts, a concrete floor structure the outer area of which is carried by the additional supports just mentioned; and (4) enclosing the space underneath such floor and roof structures by walls which do not necessarily carry any superload nor in any way serve as supports, yet effectively protect the interior of the building.

The accompanying drawings—Figs. 84 to 90, inclusive, shown on Sheet XI., herewith—are given as examples of different

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modes of carrying my invention into effect, the dwellings shown being of the class hereinafter dealt with in the present series of educational articles. Figs. 85, 87, and 88 illustrate a mode in which the outer walls of the main building take no superload, and Figs. 84, 86, and 89 illustrate another mode in which the party and outer walls take the surplus load beyond that taken by the chimney breasts. Fig 90 shows a method of construction by which practically the whole of the roof load can be transferred from the outer walls to the beam 10″. The details are not shown, but the constructionalist should have no difficulty in understanding how easily it can be done if a three-quarter-inch bolt be employed to connect the ends of each pair of roof couples. According to the first-named mode of construction the chimney breasts 8, 8′, and the side walls 5, 5, of the porch 6, of the lower story, Fig. 85, are built, and steel stanchions 7, each of which serves both stories, are erected on suitable foundations. A reinforced concrete floor, 9, which is carried, partly by the chimney breasts 8, 8′, and partly by the reinforced concrete beam 10 which is wholly carried by the chimney breasts 8, 8′, is thereafter constructed. The supports already named are so disposed relatively to each other that the floor is carried mainly by the breasts 8, 8′, its surplus load being taken partly by the walls 5, 5, of the porch 6, partly by the party wall 14, and partly by the stanchions 7. Auxiliary beams, 11, are formed where required, their reinforcement being carried by the stanchions 7, which have openings formed in their web to receive the reinforcing bars, which, if their ends be simply bent over, require no further fixing. A similar construction to that just described for the floor of the upper storey may be adopted for a flat monolithic roof 13, and when such a roof is employed in a group of four semi-detached pairs of dwellings the beam 10′ is preferably carried right across, so as to rest upon all four chimney breasts.

Figs. 84, 86, and 89 show dwellings in which the use of stanchions is dispensed with, the usual eleven-inch type of wall with a two-inch cavity being utilised, together with the party wall 14, and the nine-inch solid walls of the truncated and bifurcated wing portion, to carry the surplus load of the floor and roof structures. The partitions have no load to carry, and those of each story are carried directly upon the floor to which they belong, so that they require no foundations. They are preferably constructed of concrete slabs, which are 3 ins. thick for the longer and 2½ ins. thick for the shorter walls.

Whichever of the foregoing arrangements of supports be adopted, a considerable economy can be effected in the foundations and damp-proof courses, this advantage being more pronounced in the mode of construction shown in Figs. 85, 87, and 88, as foundations are only required for the chimney breasts 8, 8′, the party wall 14, the side walls 5, 5, of the porch 6, and the bases of the stanchions 7. As the chimney breasts 8, 8′ in each pair of dwellings are arranged at right angles to each other with the party wall 14, at right angles to the two breasts 8′, 8′, between which it lies, it may be observed that the floor, 9, is thus enabled to offer unusually great resistance to lateral movement, and that it thus enables a building of exceptionally great stability to be provided at a relatively low cost. Affording, as it does, a secure anchorage, this method of floor and roof construction enables walling to be employed which requires no shuttering construction, occupies little space, has a low heat conductivity, is stable, fire-resisting, damp-proof, durable, and withal economical both to construct and maintain. Heretofore the use of thin concrete walling in cottage buildings has presented difficulties, because, according to existing methods of construction, the walling requires to be of sufficient thickness to resist not only the compressive but also the buckling stresses, which, in a building with an upper floor on which there are moving loads, are severe.

Another of the advantages of my method of construction is that it enables the walling to be erected in two thicknesses, and as only one of these thicknesses need be constructed at a time, it thus enables the surface of the first erected thickness to be either treated with or to be covered by any suitable composition which is preferably capable of serving both as a heat insulating and damp-proofing medium.

The two thicknesses of the wall need not be of similar material. For the outer thickness a weather-resisting material and type of construction is required, but for the inner thickness a porous material is preferable. Suitable metallic ties are provided in the floor slab, and others are left protruding from or are inserted into the joints of the first erected thickness of walling, so that, when the second thickness is built or applied, these ties enable both thicknesses of the wall to be securely bound together and the whole walling to be effectively tied to the floor slab. The two sections of walling do not require to be of equal thickness.

If the inner thickness of the wall be first erected, its outer surface is thus wholly directly accessible, and may therefore be economically treated with or coated by the damp-proof medium, before the erection or application of the weather-resisting thickness is begun. If, on the other hand, the outer thickness be first erected, it could of course be to the inner surface of this thickness that the medium would be applied. When the application of the damp-resisting and heat-insulating medium has been completed and the second thickness of the wall has thereafter been either erected or applied, the insulating medium is thereby sandwiched between the two thicknesses of the completed wall, and is thus securely protected both from direct atmospheric influences and danger of mechanical damage.

The completed walling thus comprises three elements consisting of an inner thickness, an outer thickness, and sandwiched between these two thicknesses the third element, which is applied to the contact surface of whichever of the two wall thicknesses is first erected.

As the inner thickness of this composite type of walling need never be of greater superficial area than the side of the largest of the apartments which it encloses, and as each of such panels rests directly upon and is securely tied to the floor, and as it is tied also to the partitions, it is thus fixed on all its four edges, it is thereby protected against lateral movement to the full extent of the stability afforded by the floor and roof structures. Such walling, be it noted, has no floor or any moving or other superload to carry, so that it has not to contend with any of the usual buckling stresses such as are present in the ordinary type of two-story cottage, in which the whole structure is dependent on the walling of the lower story for its stability.

If two buildings were erected to the plan Fig. 84, the one in accordance with my method, the other according to any existing method, the latter to be strictly representative would require to have timber joists. With a timber-floor structure the ends of the joists would rest upon a wall-plate built into the inner thickness of the back and front walls, and be supported intermediately by 4½-in. brick partitions lying parallel with these walls. Neither the chimney breasts, 8, 8′, the end wall, 15, nor the party wall, 14, would have any part in supporting the load. If the solid sectional area of the inner thickness of wall which is alone directly supporting the ends of the floor joists be calculated the result will probably astonish the calculator, and if he will forthwith proceed to make similar calculations in regard to sectional area of the vertical members supporting the floor slab in the building erected in accordance with my method he will have to include the sectional area of the inner 4½ in. thickness of the whole of the outer wall, including the end wall 15, and the entire solid areas of the chimney breasts 8, 8′, and of the party wall 14. If, thereafter, he will carefully compare the two sets of figures and try to form some sort of idea of the widely divergent results and follow this up with some calculation as to the amount of money and material at present wasted he will probably be astonished. It is all so simple.

Looking now at Fig. 85, it will be readily understood that, with the method of construction shown on this plan, a properly constructed composite wall 4½ in. thick may with perfect confidence be relied upon as having a margin of safety very much greater than that of the 9-in. solid or of the 11-in. cavity walls of the timber joisted building of existing type, just described. As timber is certain to be both scarce and costly and may even indeed be unobtainable in sufficient quantity for cottage building purposes for years after the war, the greatly extended use of concrete in cottage construction is now imperative, and the value of any efficient and economical method of utilising it is therefore obvious.

(To be continued.)

OBITUARY.

Captain Ronald Lindsay Johnson, R.F.A., killed on May 28, was the fourth and youngest son of the late William Henry Johnson and Mrs. W. H. Johnson, of Woodleigh, Dunham Massey, Altrincham. He was educated at Eton and King's College, Cambridge, where he took honours degree in Classics. In 1912 he went to Australia, and entered the branch office in Sydney of the Manchester firm of Messrs. R. Johnson, Clapham and Morris, with which his father was long connected as chairman and managing director. Immediately on the outbreak of the war he returned to England, and at once received a commission. He went to the front in August, 1915, was wounded in September, 1916, but returned again to the front in the following December. On the death of his eldest brother, Captain W. Morton Johnson, Manchester Regiment, killed in action on July 2, 1916, Captain Ronald Johnson was appointed chairman of Messrs. R. Johnson, Clapham and Morris, and held that position at the time of his death. Captain Ronald L. Johnson is the fourth member of the family to fall in the war. Besides his eldest brother, his only two cousins have been killed in action in Mesopotamia.

The bells of the Hamburg churches are to be melted down. Of the thirty-four bells in the Nikolai Church, the largest, which is known as the "Kaiser Bell," weighs six tons and a quarter, and only one small bell of the thirty-four is now left.

Much regret is felt at the news of the death of Mr. George J. S. Kelly, C.E., which took place in hospital in France recently as a result of wounds received in action. The deceased was for many years in the employment of the Castleblayney (Co. Monaghan) Urban District Council as town surveyor, and also acted as engineer to the rural district council in that place. In August last year he volunteered for service at the front, and soon after obtained a commission in the Royal Engineers.

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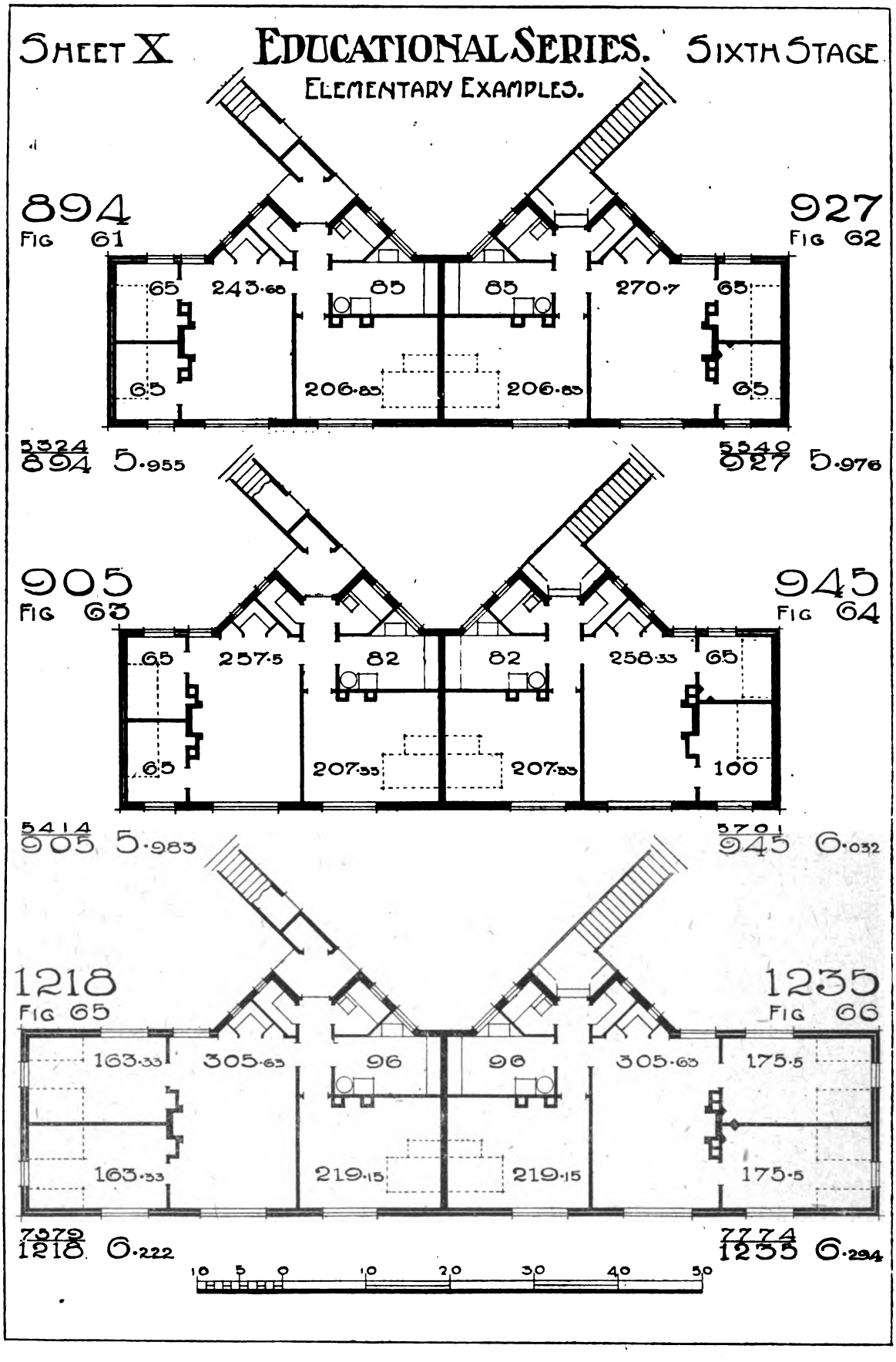

THE PROBLEM OF THE SMALL DWELLING, AND ITS SOLUTION: THE

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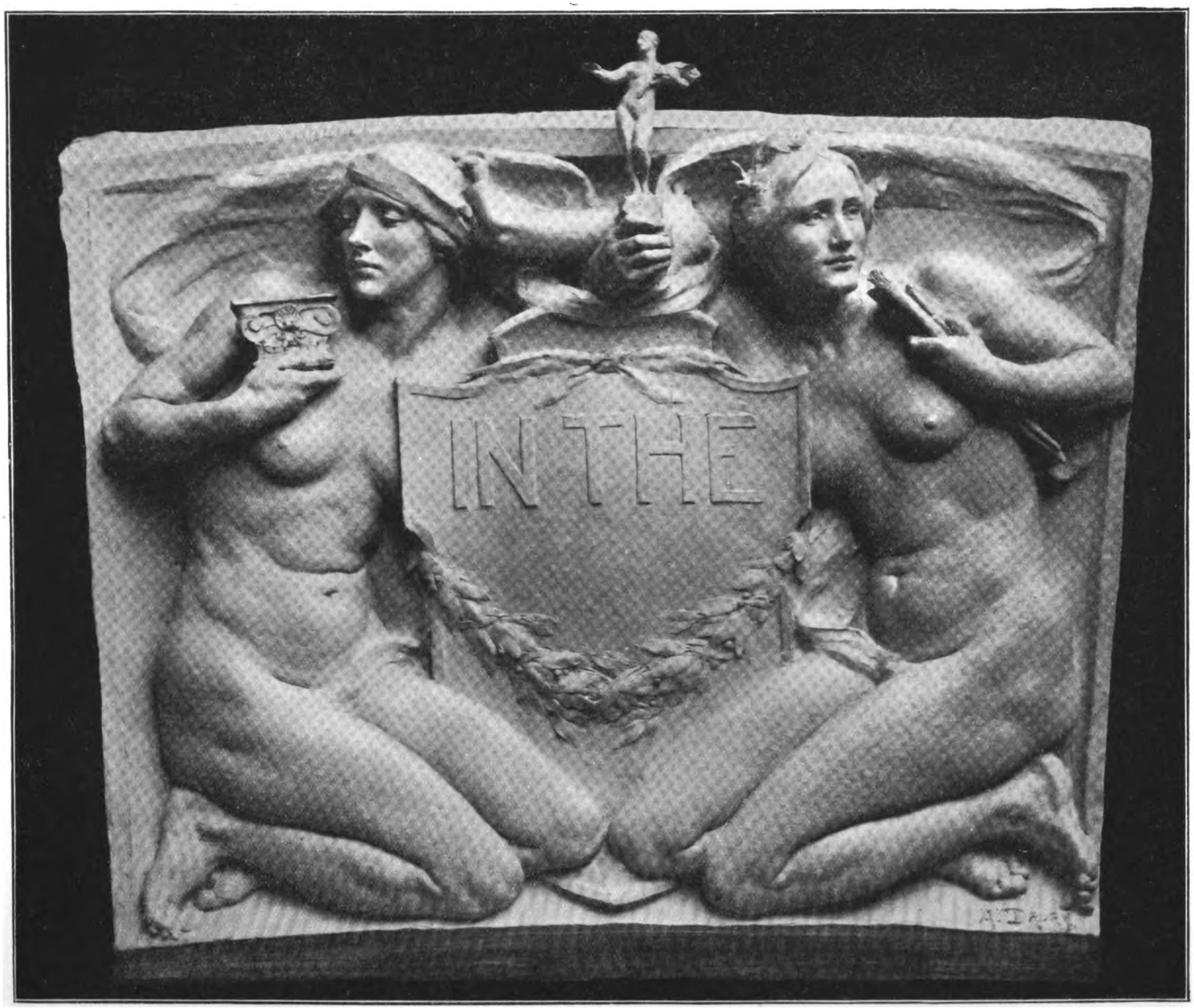

Runciman, Photo.]

THE SCULPTURED PANELS IN THE ARCHIVOLT, MAIN ENTRANCE, VICTORIA AND ALBERT MUSEUM, SOUTH KENSINGTON. Mr. ALFRED DRURY, R.A., Sculptor.

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THE EXCELLENCE
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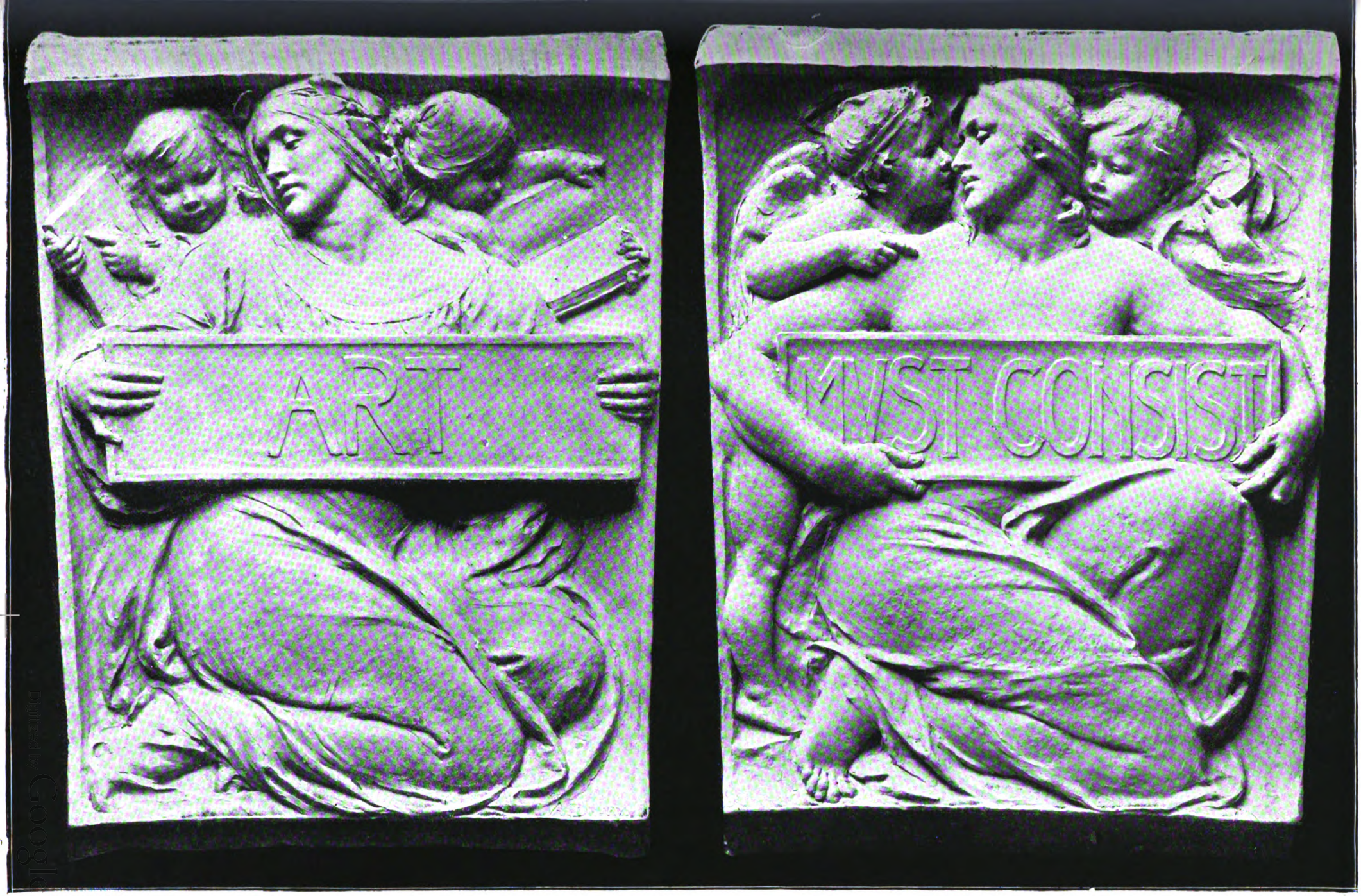

Runciman, Photo.] [*Royal Academy, 1917.*

THE SCULPTURED PANELS IN THE ARCHIVOLT, MAIN ENTRANCE, VICTORIA AND ALBERT MUSEUM, SOUTH KENSINGTON, S.W.

Mr. ALFRED DRURY, R.A., Sculptor. Sir ASTON WEBB, R.A., Architect.

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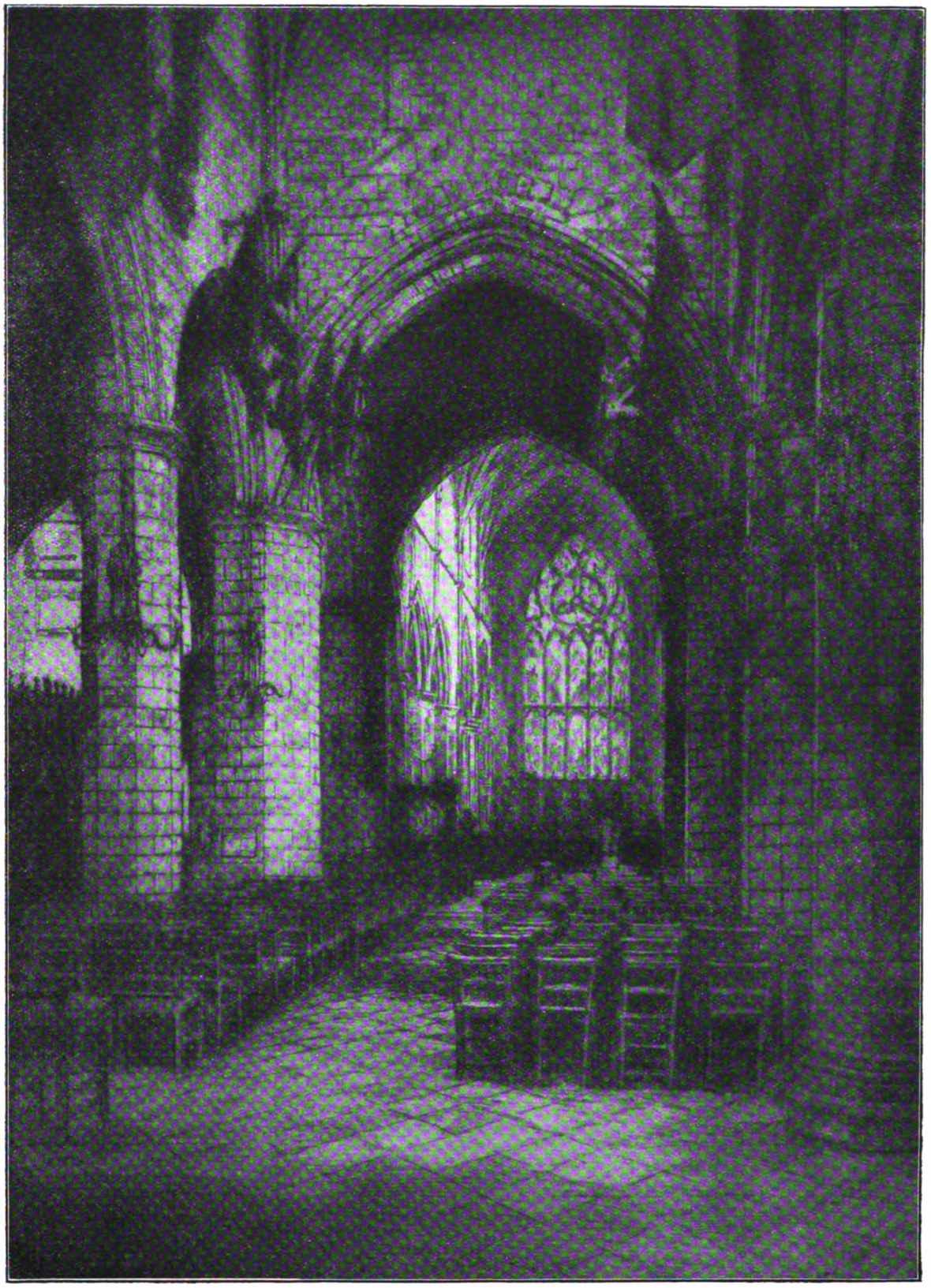

ST. GILES' CATHEDRAL, EDINBURGH: LOOKING EAST.
(Royal Academy Exhibition of Graphic Art.) From an Etching by Capt. A. E. Borthwick, A.R.E.

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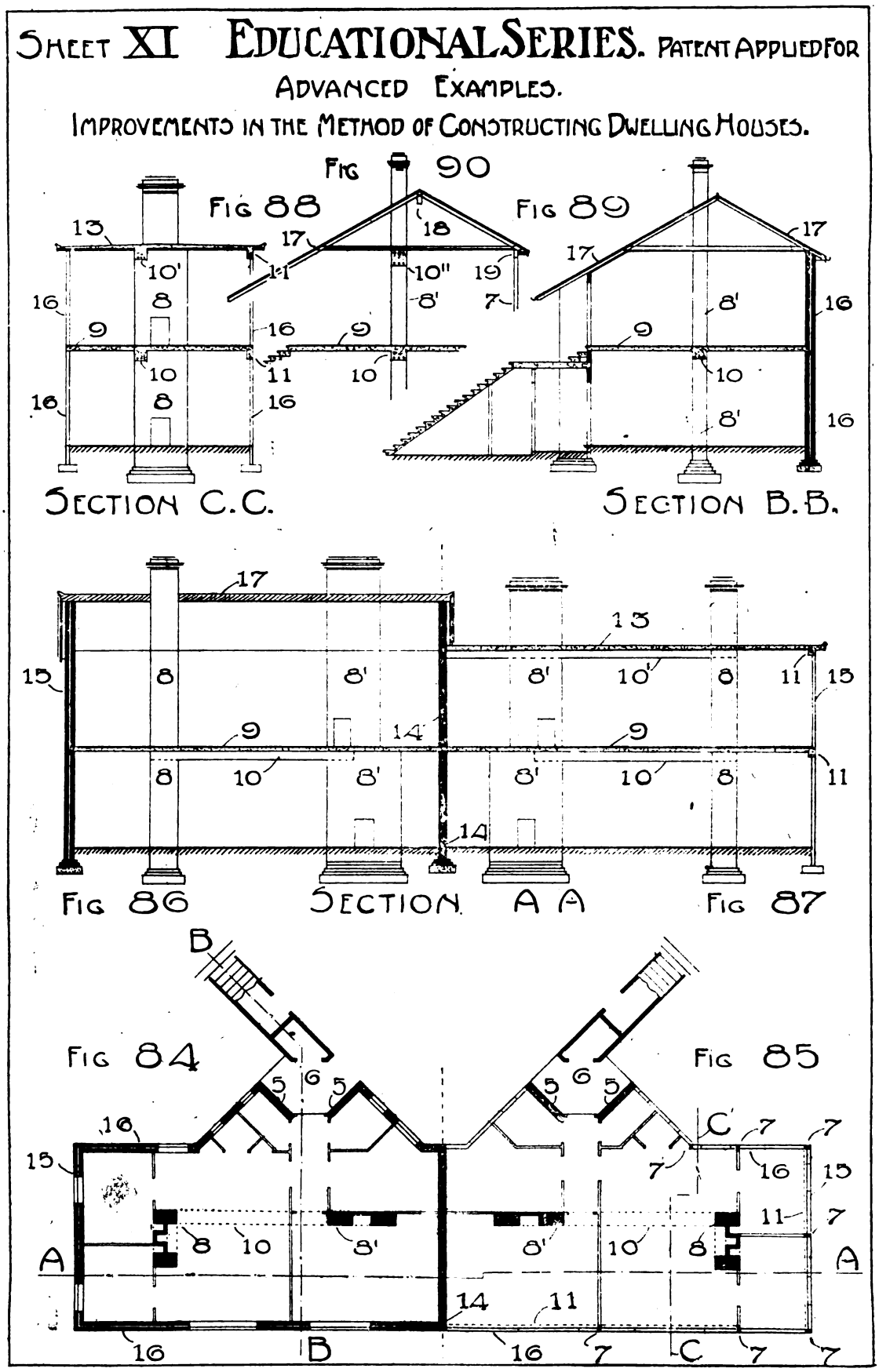

LICATION OF THE PATENTED PLAN.—By Mr. ROBERT THOMSON, Architect.

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ROYAL INSTITUTE OF BRITISH ARCHITECTS.

PRESENTATION OF THE ROYAL GOLD MEDAL TO M. HENRI NENOT.

At a general meeting of the Institute of British Architects, held last Monday in the Institute Galleries, M. Henri Paul Nénot, Membre de l'Institut, the architect of the New Sorbonne, Paris, was presented with the Royal Gold Medal for Architecture. M. Nénot, who all regretted to hear is suffering from a severe attack of bronchitis, was unable to be present in person, and the medal was received on his behalf by M. Adrien Thierry, representing the French Ambassador.

Mr. Ernest Newton, A.R.A., President of the Institute, presenting the medal, outlined the brilliant career of M. Nénot, who at the age of only nine years, made a detailed and accurate plan of the *pension* at Villiers-le-Bel. At fifteen he entered the Ecole des Beaux Arts, but his studies were interrupted in 1870 by the outbreak of the Franco-Prussian War. He joined the army, and received as his first decoration the military medal. He gained the Grand Prix de Rome in 1877, at the age of twenty-four, and when only twenty-nine years old won the great competition for the rebuilding of the Sorbonne, the great work which took seventeen years to complete, and would always be especially associated with his name. French architecture of every age showed achievements not only of the highest intellectual attainment, but containing always something more than talent—the real touch of personal and national genius. Every period of French history was brilliant, but the France of to-day was perhaps the most impressive of all.

M. Adrien Thierry, Secretary to the French Embassy, thanking the Institute for the honour bestowed on an architect of France, said the accord existing between the two nations was evidenced not only on the field of battle, but in art, finance, and all other fields as well.

We gave M. Nénot's portrait and a biographical memoir in our issue of February 28 last, an illustration of his principal work, the New Sorbonne, in that of March 7; and illustrations of some of his other buildings in those of March 21, April 4, and April 25.

PRESENTATION OF MR. ERNEST NEWTON'S PORTRAIT.

An excellent portrait of the President, by Mr. Arthur Hacker, R.A., was presented to him on his vacating the chair of the Institute. In unveiling the picture, Mr. Reginald Blomfield, Past-President, stated that for three years his predecessor had offered the services of the Institute and the profession to the Government, but the Ministers responsible received the offer with a discourtesy showing ignorance of the whole situation. The patriotic President, however, quite undaunted, offered his services to the Ministry of Munitions, where he had laboured in a most devoted manner for the last three years, convincing the authorities that architects were not all imbeciles and men of straw. Mr. Newton formally accepted the picture on behalf of the Institute.

Mr. W. W. Ratcliffe, of Belsize Park Gardens and Old Street, E.C., cabinetmaker, has left £19,822.

Plans have been approved by the Braintree Urban District Council for the construction of a tramway line across Manor Street and for a power house for the Crittall Manufacturing Company.

Major G. H. Peake, of Bawtry Hall, Yorkshire, has offered to give the sum of £10,000 towards the cost of building a new infirmary for Doncaster as a memorial to his eldest son, Lieutenant Raymond Peake, Coldstream Guards, who was killed in action in France. The Hospital Committee have accepted the offer.

By sixty-one votes to eighteen the London County Council decided last week no longer to employ "conscientious objectors" in the Council's elementary schools, but to transfer them to other branches of municipal work. We are glad the children are to escape infection, and hope the "other branches" will make it pleasant for the transferees!

Our Illustrations.

THE SCULPTURED PANELS IN THE ARCHIVOLT, MAIN ENTRANCE, VICTORIA AND ALBERT MUSEUM, SOUTH KENSINGTON, S.W.

We begin to-day a series of illustrations from the set of fine photographs now on view at the Royal Academy Exhibition, reproducing the archivolt panels sculptured over the principal doorway of the main porch of the Victoria and Albert Museum, as carried out by Mr. Alfred Drury, R.A. The legend which runs through these panels reads as follows:—"The excellence of every art must consist in the complete accomplishment of its purpose." Each of the panels is illustrative and symbolic of some one or other of the attributes of art. The series commences with "Truth," followed by "Sympathy"; then comes the subject of ("Literature") "Authenticity," and the fourth on our present double plate is devoted to "Sincerity." The single page shows the connecting and crowning panel devoted to a representation indicative of "The Arts." Our next double sheet will conclude the wording of this inscription, of which the present illustrations necessarily only show a part. The archivolt is displayed at the Royal Academy in its segment contour, but if we had followed this arched setting out the great reduction involved would have spoiled all chance of illustrating in proportionate detail the charm and beauty of these delightful figure compositions. Mr. Alfred Drury has succeeded in keeping his work well subordinated to the architectural setting. This has enormously enhanced the intentions of the carvings and ensured considerable interest in this skilful decoration. The same remark applies to the statues of Queen Victoria and the Prince Consort, which we shall illustrate at an early date as essential parts of the scheme, with the figures of "Inspiration" and "Knowledge," as well as the finials' statues of St. Michael and St. George. A four-page detail of this great entrance of Sir Aston Webb's national building appeared in THE BUILDING NEWS for January 3, 1908, and we published the entire façade on January 1, 1904, with the amended plans. The selected competition design for this museum will be found illustrated by Sir Aston Webb in our issues of August 7 and 14, also in September 11 and November 20, 1891. The same numbers, as well as those of August 21 and 28, September 4, 18, and 25, and on October 2, 1891, were illustrated by all the other competition designs. Prior to the execution of Sir Aston Webb's scheme, many various and radical changes were, of course, made. The archivolt panels have not been exhibited at the Royal Academy before, and Sir Aston Webb has this year lent to the exhibition a general photographic enlarged view of the main portals of this chief entrance. It has been arranged to give this picture in our pages later on, so as to illustrate a correct representation of the relative positions of Mr. Alfred Drury's excellent sculpture as it appears in the finished façade at Kensington.

ST. GILES' CATHEDRAL CHURCH, EDINBURGH.

Captain A. E. Borthwick, A.R.E., has lent us his capital etching of the interior of this famous Scotch cathedral, which he exhibited at the Royal Academy Exhibition of Graphic Art held this year. Architects generally are more familiar with the exterior of this building, but its charm and chief interest consist in the interior. The belfry fortunately stands intact, though the rest of the outside has been much modernised. This steeple is remarkable on account of its crown, which includes four flying buttresses gathering towards the centre, and holding aloft a lantern spire resembling an imperial corona—a masterpiece of masonry which probably was finished in 1495. It forms a conspicuous object in almost every view of Edinburgh. At Newcastle-on-Tyne St. Nicholas' Cathedral has a similar termination, and belongs to the same period; but the tower of King's College, Aberdeen, was not built till early in the sixteenth century, though that lantern follows out very closely the same idea. The fine, mediæval crowns of Linlithgow and Haddington Churches, both by Scotch architects, have disappeared. The belfry of St. Dunstan's, in Fleet Street, London, the work of John Shaw (1776-1832), is based upon similar lines, and is a distinctive piece of design as a steeple of its time. The Cathedral of St. Giles occupies the site of the original parish church of Edinburgh, standing in the centre of the old town. The parish belonged to the diocese of Lindisfarne in the ninth century. Alexander I. erected a new church about A.D. 1120. This building was much damaged by Edward II. in 1322, when the Abbey of Holyrood was also despoiled. St. Giles, for the greater part, was rebuilt, with extensions, in 1387, and then it comprised a choir of four bays with side aisles, a central crossing, and a nave of five bays, with transepts. The church had a groined roof and five chapels. Another bay was added to the choir during the fifteenth century, and subsequently the height was increased. The splendid Preston aisle was also built. The interior still remains as it was then, with minor exceptions. The chief dimensions of the building are 196 ft. from east to west by 125 ft. from north to south, measuring across the transepts. A plan of the cathedral will be found in THE BUILDING NEWS for July 21, 1911. James III. created the parish church into a collegiate minster, and by charter he formed a numerous chapter under a provost. Thirty-five chapels were served by special priests, one to each altar, consequently, including others with various duties to attend, the number of clergy attached to this establishment numbered 100. The Town Council of Edinburgh did their utmost to bring about this raising of the status of their parish church, and many of the Guilds of the town had chapels assigned to them. The disturbances of political factions at the time of the Reformation caused much damage to the buildings belonging to St. Giles and its church. Pillage ensued, and the altars were torn down by the rioters. John Knox was, after these events, elected the minister, and the fabric was reduced to the status of a parish church, and the magistrates cut the interior up into sections, so that a court of justice, a grammar school, town clerk's offices, a weavers' workshop, accommodation for the detention of criminals, and space for housing "the maiden" (an instrument of public executions), were provided, while the "High Church" occupied the choir and the "Tolbooth Church" utilised the nave. In 1635, when Laud's new liturgy was introduced, St. Giles was constituted the See of a Bishopric, and the choir was fitted up for cathedral use. The Episcopalians were, however, once more ejected at the Revolution, when the Presbyterians were given the use of this church. Thereupon it was again divided, and galleries were built. The "Tolbooth Church" occupied the south-west angle, Haddon's Hole Church met in the north-west angle, and "The Old Church" used the south transept. The General Assembly met in the Preston aisle. Under the crossing a police office was fitted up, and other secular uses were installed elsewhere. In 1829 the outside of the building was entirely refaced, excepting the tower, the interior being left partitioned off into three separate churches, viz., "The High Church," "West St. Giles' Church," and "The Old Church." The architectural character of the exterior was utterly spoiled, though the belfry was fortunately spared. No doubt it was an improvement to remove, as was then done, the shanties and insanitary tenements impinging upon the walls, as well as the "Lucken booths" that encroached upon the church. The Lord Provost, Dr. William Chambers, between 1870 and 1883, was instrumental in clearing away the partitions which cut up the interior so badly, and St. Giles, thus restored, once more became, as it remains to this day, one of the largest and most interesting Gothic buildings in Scotland. The accompanying etching furnishes an excellent idea of its strong simplicity and well-proportioned architectural design, tastefully delineated with the artist's charming rendering of light and shade. The church contains many monuments of historical value, including the Montrose Chapel, built by Walter

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Chapman in honour of his patron, James IV. The great Marquis of Montrose was buried in the vaults below after his execution hard by. He is commemorated by a mural monument, designed by Sir Rowand Anderson, with a recumbent effigy by Mr. John Rhind, the sculptor. The same architect erected the tomb in St. Giles' Cathedral to Lord President Inglis. Both these fine works were illustrated in THE BUILDING NEWS for June 27, 1902. The windows include some remarkable stained glass by Burne Jones. The Royal Scott's memorial was the work of William Birnie Rhind, R.S.A. King George V. opened the beautiful new Chapel of the Order of the Thistle, added to St. Giles' Cathedral by Sir Robert Lorimer, R.S.A., on July 19, 1911, and we published some specially-taken photographs of this florid building in our following issue on July 21, 1911. Several illustrations of St. Giles' Church, and much historical information about it, will be found in Messrs. MacGibbon and Ross' standard work on "The Ecclesiastical Architecture of Scotland." Captain Borthwick's etching, here reproduced to a smaller size, is published by Messrs. Aitkin, Dott and Son, of the "Scottish Gallery," Edinburgh. The size of their print is 15 in. by 11 in. The proofs, limited to 200 prints, are £3 3s. each.

THE PROBLEM OF THE SMALL DWELLING AND ITS SOLUTION.

Two more pages of plans are here given, with Mr. Robert Thomson's sixth article dealing with the contrivance of houses of this class. The previous illustrations and detailed descriptions will be found in THE BUILDING NEWS for May 23 and 30, June 6, 13, and 20. Others will follow next week.

CHIPS.

Mr. Herbert Batsford, architectural publisher, of High Holborn, left £6,634.

Lieutenant J. H. Westlake, a pupil in the Taunton borough surveyor's department, has been killed in action.

The Jarrow Town Council have instructed the surveyor to prepare plans for additional sheds in the corporation yard for the better protection of the rolling stock.

The Hebburn Urban District Council have instructed the deputy surveyor to obtain tenders for alterations to premises to be used as a maternity and child-welfare centre.

The death is announced, on June 18, at 7, Belsize Park Gardens, Hampstead, of Mrs. Catherine Smith, widow of the late Prof. T. Roger Smith, F.R.I.B.A., in her eighty-fifth year.

Owing to war exigencies and timber scarcity, King's Wood, between Totteridge and Penn, 185 acres of beeches, one of the prettiest and most familiar picnicking haunts in Bucks, is sold to be cut down.

A meeting, to be presided over by Lord Moulton, will be held to-morrow at Westminster Central Hall, at which a scheme will be submitted to provide for an artistic memorial of Old Leysians lost in the war.

To the position of Surveyor the Camberley Urban District Council has appointed, out of sixty applicants, Mr. H. Fox Hill, at present surveyor and sanitary inspector to the Ware Urban District Council. The post carries with it a salary of £250 per annum.

In the list of honours conferred on his Majesty's birthday we notice the name of Mr. Robert Murray Hyslop, who received the honour of knighthood. Sir Robert is the managing director of the well-known firm of Bayliss, Jones and Bayliss, Monmore Green, Wolverhampton.

Lieutenant John Rookhurst Platt, R.F.A., of Youlston Park, near Barnstaple, Captain of the Oppidans at Eton in 1909, only son of the late S. R. Platt, three times Mayor of Oldham and grandson of John Platt, M.P., one of the founders of the engineering firm of Platt Brothers, who died from wounds in Belgium on March 27, 1916, has left estate of the gross value of £234,559.

Lieut.-Colonel A. J. Allen-Williams, R.E., who has been responsible for the executive construction control of the inland waterways and docks under General Collard, has been recently promoted to Deputy Director of Inland Waterways and Docks, with the rank of Colonel. Colonel Williams is in command of the depôt and principal works establishment of the directorate.

ARCHITECTURAL SCHOOLS IN WAR TIME.

Throughout the length and breadth of the land American universities have maintained staunch and historically dignified traditions of service to the nation. As fountain sources of knowledge and as training schools for the adaptation of variegated human ability, they have been quick to turn to national advantage their vast resources in several scores of fields; their facilities of men, minds and materials; their carefully analysed experiences in numerous scientific branches of endeavour; their great buildings and laboratories; the intricate machinery of teaching and of educational administration. And all of this has been in addition to the efforts which these institutions have made in the strictly military field, in which, be it said, the universities have established training corps to prepare men for every arm of both army and navy service from red cross to coast patrol, from aviation to field artillery, from radio engineering to cavalry. Of the architectural schools, however, according to the *American Architect*, only Columbia has thus far undertaken definite professional service in its own field of instruction.

As part of the nation-wide movement for the improvement of the equipment necessary to take care of a large army in active service, St. Luke's Hospital in New York City proposed to erect upon ground adjacent to its present buildings, and hitherto reserved for additional pavilions subsequently to be erected as part of an original plan, an emergency government hospital equipped to provide for the needs of two hundred military patients, wounded or sick, sent back from the firing line to regain health and strength. It was proposed to erect a structure temporary in a sense, but of such materials as to be of use for a space of years, if necessary; in other words, and in terms of war times, a permanent building as distinguished from a base hospital.

To plan and bring into execution this building the School of Architecture at Columbia, situated but three blocks distant, was engaged as architect and the head of its department of design was definitely appointed consulting architect. The serious business of designing the building in question was undertaken in one of the school's drafting rooms, in which was established a regular office with its quota of assistants, a full personnel from chief draftsman to office boy. Volunteers from the student body have carried on the work of this office, drafting and tracing and detailing, specification writing and other routine duties; these volunteers have been relieved from a proportionate amount of their required lectures and other courses in return for such service.

Such a course might well have been initiated here. The value of such an undertaking to school and students alike, from the standpoint of national service as well as from that of professional teaching, is not to be underrated. The project offered unusual instructional advantages, chiefly for the reason that it made possible a happy combination of architectural practice with architectural instruction, blending the effect of the office and the class room in a manner altogether impracticable or impossible under normal conditions. As a matter of fact, this may be considered the first instance of the establishment of a practical laboratory in connection with a school of architecture, in which a definite commission was undertaken.

There must be tasks similar to that found by Columbia in or near every great city containing a school of architecture.

The architect's professional service does not cease because of war; war should increase his responsibility, but as regularly as possible in the professional sense. Our own government took many months to require this, and still does so most inadequately. Possibly because no architectural body here gave such solid proof of the value of architectural service as Columbia has done.

The Bedwellty District Council have approved the recommendation of the special committee that negotiations be opened for sites for the erection of 1,000 houses after the war.

Correspondence.

ARCHITECTS' CHARGES AND THE INSTITUTE SCALE.

To the Editor of the BUILDING NEWS.

Sir,—A claim recently made by an architect for the recovery of his charges for work done came before Mr. Pollock, the Official Referee, and it is a case of considerable interest to the profession.

The claim, which was a heavy one, was for work in designing various schemes for the building of a theatre. The architect is a well-known theatre designer, having erected in London and the provinces more than fifty theatres, and, for the purposes of this communication, I will confine myself to the scheme which was finally approved, but which was not proceeded with because of the war.

I gave evidence on behalf of the architect, and I was supported by two other architects. A well-known member of the Institute gave evidence on behalf of the client, and he, also, was supported by two other architects.

The approved design having been abandoned, for the reason stated, my evidence was based entirely on Clause 5 of the schedule of charges sanctioned by the Royal Institute in 1898, and it may be well to quote here, in full, that clause:—

"If the architect should have drawn out the approved design, with plans, elevations, sections, and specification, the charge is 2½ per cent. upon the estimated cost. If he should have procured tenders in accordance with the instruction of his employer, the charge is ½ per cent. in addition. Two and a-half per cent. is charged upon any works originally included in the contract or tender, but subsequently omitted in execution. These charges are exclusive of the charge for taking out quantities. Preliminary sketches and interviews, where the drawings are not further proceeded with, are charged for according to the trouble involved and time expended."

In this case tenders were not procured, and the specification was not written.

The drawings upon which I based my evidence, and upon which the evidence of the architects acting for the client was also based, consisted of ten in all—most carefully drawn, inked in, and finished to an eighth scale, and embracing all the well-known skill and experience of the expert theatre architect. Figured plans of the cellars and lower floor; plan at entrance level, showing exits, entrances, orchestra, dressing-rooms, etc.; separate plans of all the other levels; and plan of roof, showing the steel trusses, the different flats, and other items, were also shown, including one elevation and a longitudinal section, most carefully drawn, with roof, and scantlings of all timbers figured. This section also showed the steel principals and the internal elevation of a portion of the architectural decorations. The seating of the various levels was also carefully shown. A section, not quite completed, showing the stairs, and an outline plan, showing the drainage system, completed the set.

Having arrived at the conclusion that these drawings, with the specifications, were amply sufficient for the quantity surveyor to take out the quantities, and that a builder could have proceeded with the erection of the theatre, after being furnished with the specifications and with the usual details which would have been supplied immediately after the order to commence work had been given, I said that, deducting the sum of 100 guineas for the specification which was not written, the architect was fully entitled to the 2½ per cent. provided for in Clause 5 of the schedule.

The architects on the other side denied this, and gave as their reasons that the drawings were not sufficient for a quantity surveyor; that details of the constructional steel work, details of the stone work and joiners' work, and a plan of the drains were absent, in addition to the fact that the specification had not been written.

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I stated in court that the usual practice is to await the acceptance of a tender before the above-mentioned details are supplied; that the details of the constructional steel-work for a theatre are supplied by the engineer, to whom the architect furnishes the drawings of the building, and all other information required, and that the detailed plan of the drains, at the stage in this case, was not necessary.

I also pointed to the fact that, whereas in Clause 1 of the schedule (the 5 per cent. clause) the words "general and detailed drawings" are inserted, in Clause 5 (the 2½ per cent. clause) those words are omitted, showing that the "details" come within the remaining 2½ per cent.

We know that the "schedule" is under revision by the Institute, and this case, with others of a like nature which have been before the Courts, points to the urgent necessity of such wording as will render it impossible for more than one interpretation to be placed upon the meaning of Clause 5. It is a matter of regret, and it must so appear to the Courts, that members of the same Institute, working under the same schedule of charges, and giving evidence to "assist the Court," should state opinions quite at variance with each other on the same clause of the same schedule. I do not intend to urge that my view of Clause 5 is the right one, and that of my opponent the wrong one; but I do say that it is quite time that on such a confined and narrow issue as that embraced by Clause 5 there should be far greater unanimity of opinion than there appears to be at the present moment.

Mr. Pollock raised one important point in this case, and that was that it is not sufficient to merely make a *deduction* for what has *not* been done under Clause 5, i.e., for the specification in this case not written. The specific requirements under the clause must be strictly complied with, as otherwise the charges must become a matter of *quantum meruit*.

I am, Sir, your most obedient servant,
WM. WOODWARD.

13, Southampton Street, Strand, W.C.,
June 21, 1917.

Our Office Table.

It was a shock to many to find that the German tentacles in the City of London had been thrown round so British an institution as the George and Vulture and Thomas's Chop House. This little eating-house, with its Pickwickian memories, lies in an alley under the shadow of the ex-Deutsche Bank, which acquired it, certainly for no sentimental or antiquarian reasons. "Established 1600" is over the yellow lintel of the door, but, of course, the ancient tavern was burned in the Great Fire. The building offered last week is said to be the place where coffee was first sold in England. It was a famous meeting-place of the eighteenth-century wits. Then there are the recollections of Mr. Pickwick and Sam Weller, recalled for present-day chop-eaters by the Dickens portrait in the long room. No one would pay the reserve price for the tavern, and it was withdrawn from sale at £17,500.

The observations on the rate of growth of cracks in the buildings of the Tower of London, says the report of the National Physical Laboratory, presented at the annual meeting last week, have been continued. No serious disturbances have been detected, but careful examination of the roadway on the quay wall facing the river has revealed that movements of the wall not amounting to more than a few hundredths of an inch have taken place, presumably of the nature of a slide towards the river of the whole block of masonry which carries the roadway.

A decision has been given by the Income-Tax Commissioners on an appeal case where the managers of an Episcopal church in Aberdeenshire pleaded that as the rectory buildings are part of the rector's stipend, he, and not they, is responsible for payment of the property tax. The Rector took the opposite view, and pleaded, in addition, that if the managers' contention that the rectory is part of the stipend were correct, it would not be "unearned increment," and computation should be made at a lower rate. The Commissioners rejected the plea of the managers, and held that the annual value of a rectory in Scotland does not form part of the rector's income. Consequently, unless managers have secured an agreement from the rector to undertake payment, they are responsible. This decision affects all religious bodies, except the Church of Scotland.

Referring to the concreting of coal slack, Mr. Clinch Jones writes to the *Engineer* to say that in 1875 the late W. A. Lyttle, of the General Post Office, London, took out Patent No. 105, in which the concreting of fuel is very fully entered into. "In 1876," continues Mr. Jones, "I put down plant for Lyttle's Iron Company, Ltd., for making concrete from coal slack and carbonate of lime, ground together in a moist state, and then briquetted into lumps about 4-in. cube. We ran two blast-furnaces on this fuel only, and produced pig iron that sold for top prices, showing that the fuel was right. As this patent has long since expired, any person can concrete fuel, by the method it describes, without paying royalties."

The thirty-sixth conference of the National Federation of Property Owners and Ratepayers was held at Blackpool last Friday, Mr. Edwin Evans, vice-chairman of the Housing of the Working Classes Committee of the L.C.C., presiding.—The President said it was the duty of property owners at a time of great national stress like the present to set a good example and deal with their tenants in a generous spirit, seeking no advantage from the conditions of war, but preserving as far as possible the status quo. The same applied to mortgages. On the other hand, tenants should be less exacting in their demands. The general body of property owners would look for the removal of restrictive legislation at the earliest possible period after the war, and for that reason it was absolutely necessary that no hasty or arbitrary suggestions as to future increases of rents should be made an excuse for agitators to attempt to force upon owners legislation which would permanently injure their interests or stop the erection of new houses, and thus throw upon the country additional burdens which most assuredly would follow State or municipal housing. The President referred to the growing strength of the federation, 200 new members being added so far this year. They had not yet begun to realise the enormous power of the organisation and the immense importance of the work ahead of them, but by seeing that every town of importance had its Property Owners' Association they could turn the scale in many Parliamentary elections. He hoped that after the war there would be less politics and more real business, and that better wages would make better men and better tenants, who would look for better representation in Parliament. He trusted, also, that they would get into closer touch with labour, and that the time was not far distant when the Labour Party might begin to understand that landlords had to labour as well as themselves.—The meeting favoured a suggestion, by Mr. Cheverton-Brown, for the founding of a Property Owners' Building Society, primarily to help and relieve members who had mortgages called in after the war.

TRADE NOTES.

Boyle's latest patent "air-pump" ventilators, supplied by Messrs. Robert Boyle and Son, ventilating engineers, 64, Holborn Viaduct, London, have been employed at H.M. Factory, Litherland, Liverpool.

At a meeting of the Rating Valuers' Association, held at the Adelphi Hotel, Liverpool, Mr. Isaac Dixon, junior, P.A.S.I., assistant rating surveyor to the parish of Liverpool, now serving with the Forces, was presented with a handsome gold watch, which the association asked him to accept as a token of their appreciation of his valuable services as honorary secretary.

LEGAL INTELLIGENCE.

THEATRICAL ARCHITECT'S CHARGES DISPUTED.—BENNETT V. SPRAGUE.—ARCHITECTS DIFFER IN REGARD TO CLAUSE 5 OF THE R.I.B.A. SCHEDULE OF CHARGES.—In this case, which began last term, and was decided by Mr. Pollock, the Official Referee, on the 8th inst., Mr. Hy. George Dudley Bennett claimed from Mr. Wm. S. R. Sprague, architect, of the Criterion Chambers, his brother-in-law, £756 7s. 6d., money advanced to him in regard to alleged theatre-building speculations. The defendant counterclaimed, for an amount considerably in excess of the claim, for professional services.—Mr. Rose-Innes, K.C., for the plaintiff, said that defendant did not dispute the advances of money, but in his affidavit of defence he set up a counterclaim which exceeded the claim considerably. He said that he had done professional work in connection with the Shakespeare Theatre at Clapham Junction and the Opera House at Coventry, and claimed that he was entitled to be paid for that work. In respect of the professional work £323 17s. 6d. had been paid. That was paid on an account for work done, but the defendant now claimed double the amount which the plaintiff was seeking to recover. The plaintiff admitted that the defendant ought to be paid for professional work on a fair and reasonable scale, but the charges which he was now making were certainly not reasonable. As to the Shakespeare Theatre, the charges were not particularly heavy, but as to the Coventry Opera House the plaintiff said that the defendant's charges were made on a wrong basis, as the work was never carried out.—The Official Referee said that under these circumstances the onus was upon the defendant.—Mr. Spencer Bower, K.C., opened the defendant's case, relating in detail the circumstances under which the business relations had arisen and how they had been carried out.—Mr. Wm. S. R. Sprague, the defendant, gave evidence as to the financial arrangements which had from time to time taken place between him and the plaintiff, generally admitting the advances which the plaintiff claimed to have made. In cross-examination by Mr. Rose-Innes, he said that there was a private arrangement between himself and the plaintiff that cheques received by him should be regarded as a set-off against his fees. That arrangement was made about 1913, but he had no record of it, and he complained that Mr. Bennett had put into writing matters which should have been regarded as private and confidential. He complained, also, that, although the transactions between himself and the plaintiff were "private and confidential," the plaintiff had written to him in respect of them through his secretary. Many witnesses were called, including professional experts, of whom Mr. Alfred W. S. Cross, M.A., F.R.I.B.A., Mr. John Coulson Nicoll, A.R.I.B.A., of Birmingham, and Mr. C. W. Brooks, F.S.I., A.R.I.B.A., quantity surveyor, gave evidence for the plaintiff; and Mr. William Woodward, F.R.I.B.A., F.S.I., Mr. Oswald C. Wylson, F.R.I.B.A., and Mr. C. W. Booth, F.S.I., quantity surveyor, for the defendant.—In the end the Official Referee gave judgment for the plaintiff in the sum of £509 on the claim and counterclaim.

The death has occurred in Limerick of Mr. M. D. Mathews, builder, who was well known and most popular in the city.

Private Charles Lake, of the Royal Artists' Rifles, son of Mr. G. W. Lake, Mayor's officer and the town hall keeper at King's Lynn, has been killed by a shell in France.

The London County Council has acceded to a request from Mr. Baxter Greig, the district surveyor for Deptford, for permission to appoint Mr. Ellis Marsland, the district surveyor for Camberwell, as his deputy during his absence on military service.

At the Lewes Tribunal last Friday two brothers, in partnership as builders and doing contract work at Lewes Prison, were given six months' and three months' exemption respectively. They said the engineer at the prison told them there was sufficient work in repairing the damage recently done by the Irish prisoners to last both of them five or six months.

The death occurred last Friday at her residence at Barmouth of Mrs. Fanny Talbot, a well-known philanthropist, and a friend of John Ruskin, at the age of ninety-three. She presented a number of cottages and land at Barmouth to the Guild of St. George, which John Ruskin created, and supervised their improvement. She was also a substantial subscriber to the guild. Ruskin once referred to her as "for five years the only woman of the upper classes who gave me any help."

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Olivers'
Seasoned
Hardwoods,
APPLY TO—
WM. OLIVER & SONS, Ltd.,
120, Bunhill Row, London, E.C.

TENDERS.

***** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.**

BOVEY TRACEY.—For work in connection with increased water supply at Bovey Tracey, for the Newton Rural District Council:—
Steer and Pearce (accepted) .. £137 0 0

BRENTFORD.—For repairing caretaker's cottage, for the New Brentford Burial Board:—
F. D. Hidden £22 15 0
Robinson 20 10 0
G. Challis* 19 10 0
* Accepted.

CARDIGAN.—For painting and renovating the pavilion, for the Pavilion Co.:—
W. Thomas, Carningli, Cardigan (accepted) £24 0 0

FOLESHILL.—For excavating about 1,600 yards of ground for forming storm-water and secondary land filters, for the Rural District Council:—
G. P. Trentham, Ltd., 3s. 7½d. per cubic yard (accepted).

HAMMERSMITH.—For erection of provision store and staff-room, for the Hammersmith Borough Council:—
Haskins and Bros., Ltd. £118 14 0
W. H. Cooper.. .. .. .. 55 15 0
G. W. Clarke* 54 0 0
* Accepted.

HORSHAM.—For painting and repairs to schools, etc., for the West Sussex Education Committee:—
Accepted tenders:—Billingshurst C., external painting, E. Wadey, £32 13s.; Bosham C., external painting and repairs, E. March and Sons, £48; Plaistow C., external painting and repairs, H. Haslett, £25 10s.; Southbourne C., external painting and repairs, W. R. Smith, £32; Itchingfield C., painting and repairs at school house, A. Parker, £8 18s.; Crawley C., alterations to water service, Bartley and Ward, £3 6s.

LEITH.—For the repair of damaged sewers at Starbank Road and Trinity Crescent, for the Town Council:—
Wishart, Easter Road, Leith (accepted) £127 0 0

READING.—For repairs to bridge over the river Loddon, on the Reading and Wokingham main road, for the Berkshire County Council:—
Collier and Catley, Reading, per schedule of prices (accepted).
Estimated cost £600 0 0

SEAL (KENT).—For heating church at Seal:—
Musgrave and Co., £149 10s., and about £14 for extras (accepted).

TEDDINGTON.—For supply of materials, for the Urban District Council.
Accepted tenders:—Flints, Wills and Packham, Sittingbourne; tar-paving, Constable, Hart and Co., Ltd., 41, Eastcheap, E.C.3; Portland cement, Eastwood and Co., Ltd., Belvedere Road, Lambeth, S.W.1; ferric sulphate, F. W. Berk and Co., Ltd., 1, Fenchurch Avenue, E.C.3; tools, F. Bird and Co., Horton Road, West Drayton; pipes, etc., J. Knowles and Co., 38, King's Road, St. Pancras, N.W.1.

TILBURY.—For tar-spraying military and other roads and supplying 10,000 gallons of refined tar and works incidental thereto, for the Urban District Council. Mr. S. A. Hill-Willis, engineer and surveyor:—
Accepted tenders:—T. Crow and Sons, West Ham, refined tar, 3½d. per gallon; L. Sommerfield, Ltd., Kennington Park Road, S.E., tarviated granite, 33s. per cubic yard; G. Eagleton, Aylesford, 2-in. tarred rag, 24s. per cubic yard; W. H. Bensted and Sons, Maidstone, ½-in. tarred rag, 25s. 6d. per cubic yard; J. Wall, screened gravel, 8s. per cubic yard; J. Wilton, heavy shire-bred horse, £100; Barrows and Co., Banbury, street water-cart, £30; W. and C. French, Buckhurst Hill, Essex, laying 600 ft. 15-in. pipes, £407, laying Croft artificial flagging 6s. 6d. per super yard; H. V. Smith and Co., 20, Victoria Street, Westminster, spraying only one gallon to five yards, 1½d. per super yard, spraying only one gallon to eight yards 1d. per super yard.

TOTTINGTON (LANCS.).—For building a short length of retaining wall at Loe Bridge, Bolton Road, for the Tottington Urban District Council. Mr. L. Kenyon, C.E., surveyor:—
W. A. Hargreave, Market Street, Tottington (accepted) £85 10 3

WOLVERHAMPTON.—For supply of plant, etc., for the Town Council:—
Accepted tenders:—H. Gough and Son, building work in engine room, £1,301; Gibbons Bros., Ltd., steelwork to extend roof of engine room, £350; Willans and Robinson, Ltd., turbo-alternator set, condensing plant, etc., £22,690; Higgs Bros., three 10-h.p. and one 5-h.p. motors, £180.

TO ARMS!

COUNTY OF LONDON ENGINEER VOLUNTEERS (Field Companies).
Headquarters, Balderton Street, Oxford Street, W.
Orders for the week. By Lieut.-Col C. D. Clay, V.D., Commanding.
OFFICER FOR THE WEEK.—Commander E. A. Ullman.
NEXT FOR DUTY.—Platoon Commander C. Campbell.
MONDAY, JULY 2.—Technical Instruction for No. 3 Company. Right Half Company at Regency Street. Drill No. 3 Company. Left Half Company. Signalling Class. Recruits' Drill, 6.30.
TUESDAY, JULY 3.—Lecture 6.30. Physical Drill and Bayonet Fighting, 7.30.
WEDNESDAY, JULY 4.—Drill No. 1 Company. Left Half Company.
THURSDAY, JULY 5.—Drill No. 2 Company. Left Half Company. Ambulance Class, 6.30. Signalling Class.
FRIDAY, JULY 6.—Technical Instruction for No. 3 Company. Left Half Company at Regency Street. Drill No. 3 Company. Right Half Company. Recruits' Drill, 6.30.
SATURDAY, JULY 7.—N.C.O.'s Parade, 2.30, under Platoon Commander Watkins. Map Reading.
ARMLETS.—Members are warned that armlets must be worn at all plain clothes parades.
MUSKETRY.—For all Companies see Notice at Headquarters.
NOTE.—Unless otherwise indicated all drills will take place at Headquarters.
June 30, 1917.
MACLEOD YEARSLEY,
Adjutant.

Sir Joseph Lyons died in London last Friday morning. Born in London, Sir Joseph Lyons at one time had high artistic ambitions, and several of his oil paintings were hung at the Royal Institute and other exhibitions. But he soon perceived that the process of gaining substantial success in this direction would be slow, and he relinquished art as a calling in favour of the more prosaic but infinitely more remunerative business of feeding the masses.

Fire broke out shortly after eleven o'clock last Thursday evening on the premises of Messrs. Catesby, the linoleum and furniture manufacturers, in Tottenham Court Road. The fire was brought under early control, but not before part of the roof had fallen in and damage to the extent of several thousands of pounds had been done. All business, we are glad to hear, is going on as usual.

The death has taken place, at his residence, Kilinallan, Dunblane, of Mr. Robert Dick, retired farmer and contractor, in his eighty-sixth year. In his younger days Mr. Dick travelled extensively in the Holy Land, where he met Mr. Holman Hunt, whom he accompanied on several of his journeys. Mr. Hunt mentions him in his book, "Pre-Raphaelite Brotherhood."

LIST OF TENDERS OPEN.

BUILDINGS.

June 30.—Alterations, additions, repairs, and renovations, etc., at Council schools during the summer vacation, 1917.—For the General Education Committee of the Wilts County Council.—J. G. Powell, County Surveyor, Trowbridge.

June 30.—Extensions to the isolation hospital (corrugated iron) at Immingham, and painting the whole of the sides, roofs and external woodwork of existing building and new block.—For the Grimsby Rural District Council.—The Clerk to the Council.

July 2.—Mason work, plaster work, joiner work, painter work, etc., for small alterations required on the Office of Parks and Cemeteries Department, 93, Commercial Street, Dundee.—For the Dundee Water Commissioners.—W. H. Blyth Martin, Town Clerk, Dundee.

July 10.—Erection of 100 Houses at Kilbowie, Clydebank.—For the Commissioners of H.M. Works and Public Buildings.—The Secretary, H.M. Office of Works, etc., Storey's Gate, London, S.W.1.

ENGINEERING.

July 1.—Provision of a Two-Lift Gasholder and Guide Framing with cast-iron columns, and for its erection in an existing brick tank which is about 51 ft. 6 in. diameter by 20 ft. 6 in. deep, the whole to match in all respects as nearly as may be the existing holders.—For the Dudley Gaslight Co.—F. C. Briggs, Engineer and Manager, Gasworks, Dudley.

July 31.—Installation of Heating Apparatus for St. Alban's Church and Vestry, Dartford, on the hot water system.—Mr. Hewett, 80, St. Alban's Road, Dartford.

PAINTING.

July 5.—Painting Dwyran Council School and House, and Colouring Class-Room, etc., at Llandrygarn Council School.—W. O. Jones, Tanyfron, Bodffordd, Anglesey.

July 6.—External painting of the Goodwick (Pembroke) Council School and the internal colouring of the adjoining dining-room buildings.—For the Pembrokeshire Education Authority.—The Clerk to the Education Committee, County Education Offices, Haverfordwest.

July 11.—Painting the following bridges: Crook, Daddryshield Wear, Daddryshield No. 2, High Team, Ireshopeburn, Killhope Foot, Killhope Mill, Low Team, Nancy Pasture Foot, Newton Cap, Parkhouse Pasture, Penshaw, St. Helens (Auckland), Westgate, Wearhead and Wolsingham.—For the Durham County Council.—A. E. Brookes, County Surveyor.

ROADS AND STREETS.

June 29.—Works in connection with the reconstruction of the main road between Cannock and Hednesford.—For the Cannock Urban District Council.—Chairman of the Urban District Council, Council Offices, Cannock.

June 30.—Supplying limestone macadam, gravel and chippings; granite or basalt macadam and chippings; tar-macadam and chippings at various railway stations within the borough of Merthyr Tydfil (One Year).—For the Corporation.—A. Rees, Town Clerk, Town Hall, Merthyr.

SANITARY.

July 4.—Removal of house refuse in the following districts (One Year): Brymbo Ward (Brymbo); Vron Ward (Brymbo); Lodge (Brymbo); Cefn Ward (Broughton); Rhosymedre and Cefn Bychan (Cefn); Cefn and Acrefair (Cefn).—For the Wrexham Rural District Council.—G. V. Price, Interim Clerk, Council Offices, Midland Chambers, Wrexham.

MISCELLANEOUS.

July 2.—Removal and disposal of ashes from the generating station at East Greenwich. (One year, from August 1.)—For the London County Council.—Tramways Office, 62, Finsbury Pavement, E.C.2.

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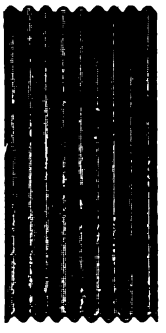

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Asbestos—
Bell's United Asbestos Co., Ltd., Southwark Street, London.
British Roofing Co., Ltd., 126, Bishopsgate, E.C.2.

Asphalte—
Claridge's Patent Asphalte Co., Ltd., Pyrimont Wharf, Cubitt Town, E.
Engert & Rolfe, Ltd., Barchester-street, Poplar.
Excel Asphalte Co., Ltd., Ceskym Works, Dorset Wharf, Hammersmith, W.
Shepherd, William, & Sons, Ltd., Milkstone, Rochdale.
Val de Travers Asphalte Co., Ltd., Hamilton House, Bishopsgate, E.C.
Vulcanite, Ltd., 118, Cannon-street, London, E.C.4.

Belfast Principals—
Bullen Bros. & Sons, Ltd., 242, Upper Parliament Street, Liverpool, S.

Bells—
Barwell, Jas., Great Hampton-street, Birmingham.
Gillett & Johnston, Croydon.

Bitumen Solution—
Vulcanite, Ltd., 118, Cannon-street, London, E.C.4.

Blinds—
Francis, S. W., & Co., Ltd., 66, Gray's Inn-road, W.C.
Williams, G. A., and Son, 42, Queen's-road, W.

Boilers—
Haywards, Ltd., 187-201, Union-street, S.E.1.
Messenger & Co., Ltd., Loughborough.

Books—
Basford, B. T., 94, High Holborn, W.C.
Foyle, W. & G., 121 and 123, Charing Cross-rd., W.C.

Bricks—
Builders' Material Association, 92, Berwick-street, Oxford-street, W.
Dennis H. Dyke, Ruabon.
Hathern Station Brick Co., Ltd., Loughborough.
Tucker, G., & Son, Ltd., Loughborough.

Builders' Merchants—
Builders' Material Association, 92, Berwick-street, Oxford-street, W.
Sessions and Sons, Ltd., Gloucester.

Building Composition—
White, W., Ltd., Abergavenny.

Calorifiers—
Royles, Limited, Irlam, near Manchester

Casements and Windows—
Braby, F., & Co., Ltd., Euston-road, N.W.
Crittall Manufacturing Co., Ltd., Braintree.
General Iron Foundry Co., Ltd., Brooks' Wharf, Upper Thames-st., E.C.
Haywards, Ltd., 187-201, Union-street, S.E.1.
Williams, Gamon & Co., Kaleyards Works, Chester.

Ceilings—
British Uralite Co., Ltd., (Room 18), 85, Gresham-street, E.C.

Cement, &c. —
Builders' Material Association, 92, Berwick-street, W.
Kaye & Co., Ltd., Southam Works, Rugby.
Wouldham Cement Co., Ltd., 85, Great St. Helens, E.C.

Cement Waterproofers—
Builders' Material Association, 92, Berwick Street, W.
Ironite Co., The, Ltd., 11, Old Queen-st., Westminster, S.W.
Kerner-Greenwood & Co., Ann's-square, King's Lynn.

Chimney Pieces—
Sessions & Sons, Ltd., Gloucester.

Chimney Pots—
Builders' Material Association, 92, Berwick-street, W.
Hathern Station Brick Co., Ltd., Loughborough.

Coal Plates—
Haywards, Ltd., 187-201, Union-street, S.E.1.

Cisterns—
Braby, F., & Co., Euston-road, N.W.
Builders' Material Association, 92, Berwick-street, W.

Clockmakers—
Gillett & Johnston, Croydon.
Smith, J., & Sons, Ltd., Derby.

Constructional Steelwork—
Blakeley, E. F., and Co. (Liverpool), Ltd., Vauxhall Ironworks, Birkenhead.

Copperlite Glazing—
Haywards, Ltd., 187-201, Union Street, S.E.1.

Copper Roofing—
Braby, F., & Co., Ltd., 852, Euston-road, N.W.

Cork Lino—
Catesbys, Ltd., 64-67, Tottenham Court Road, London, W.1.

Damp-proof Courses—
Anderson, D., & Sons, Ltd., Lagan Felt Works, Belfast.
British Roofing Co., Ltd., 126, Bishopsgate, E.C.2.
Engert & Rolfe, Ltd., Barchester-street, Poplar.
Tunstall & Co., Ltd., Leeds Bridge, Leeds.
Val de Travers Asphalte Co., Ltd., Hamilton House, Bishopsgate, E.C.
Vulcanite, Ltd., 118, Cannon-street, London, E.C.4.
White, W., Ltd., Abergavenny.

"Decolite"—
Bell's United Asbestos Co., Ltd., Southwark Street, London.

Doors (Iron, Steel, &c.)—
Crittall Manufacturing Co., Ltd., Braintree.
General Iron Foundry Co., Ltd., Brooks Wharf, Upper Thames-st., E.C.
Haywards, Ltd., 187-201, Union-street, S.E.1.
Hobbs, Hart & Co., Ltd., Arlington-street, N.
Tann, John, Ltd., 117, Newgate-street, E.C.
Whitfield's Safe and Door Co., Oxford-street, Birmingham.

Electric Lighting—
Edey, F. G., & Co., Ltd., 25, Warwick-lane, Newgate-st., E.C.

Electric Light Fittings—
Edison & Swan United Electric Light Co., Ltd., Ponders End, Middlesex.

Emery and Glass Paper—
Oakey, John, & Sons, Ltd., Westminster Bridge-road, S.E.

Engraving—
Marshall Engraving Co., 12 & 14, Farringdon-av., London, E.C.

Fascias, &c.—
Francis, S. W., & Co., Ltd., 66, Gray's Inn-road, W.C.

Felt—
Anderson, D., & Sons, Ltd., Lagan Felt Works, Belfast.
Engert & Rolfe, Ltd., Barchester-street, Poplar, E.
McNeill, F., & Co., Ltd., 4, South Place, London, E.C.2.
Vulcanite, Ltd., 118, Cannon-street, London, E.C.4.

Fencing—
Kent County Fencing Co., 60, Borough Green, Kent.

Fibrous Plaster Work—
Modellers & Casters Co., The, Ltd., 11, Argyle-street, Liverpool.

Filters—
Royles, Limited, Irlam, near Manchester.

Fire Cements—
Builders' Material Association, 92, Berwick-street, W.

Fireproof Paints and Stains—
Victor Marriott, Ltd., Proprietors of The Cyanite Paint Co., 8, Normandy Place, Brixton, S.W.

Fireproof Partition Slabs—
British Uralite Co., Ltd., (Room 18), 85, Gresham-street, E.C.
Builders' Material Association, 92, Berwick-street, W.

Flange Coupling—
Royles, Limited, Irlam, near Manchester.

Floors and Partitions (Fireproof)—
Bell's United Asbestos Co., Ltd., Southwark Street, London.
British Reinforced Concrete Engineering Co., The, Ltd., 1, Dickinson-street, Manchester.
Dawnay, A. D., & Sons, Ltd., 39, Victoria-street, S.W.
Haywards, Ltd., 187-201, Union-street, S.E.1.
Kleine Patent Fire-Resisting Flooring Syndicate, Ltd., 133-136, High Holborn, W.C.

Flooring—
Bell's United Asbestos Co., Ltd., Southwark Street, London.
Ironite Co., The, Ltd., 11, Old Queen-st., Westminster, S.W.
Manchester Marbleite Floor and Wall Co., Ltd., 22, Booth Street, Manchester.
Turpin's Company, 25, Notting Hill Gate, W.11.

Furniture: Church, Institute, Office.
Hammer, Geo. M., & Co., Ltd., 430, Strand, London, W.C.

Gas Heaters—
Royles, Ltd., Irlam, near Manchester.

Gates, Railings, &c.—
Haywards, Ltd., 187-201, Union-street, S.E.1.

Girders—
Henderson & Glass, Vulcan-street, Liverpool.

Glass (Bevellers and Polishers)—
Clark, James, & Son, Ltd., 1-7, Scoresby-st., Blackfriars-rd., S.E.

Glass (Plate, Sheet, Ornamental)—
Clark, James, & Son, Ltd., 1-7, Scoresby-st., Blackfriars-rd., S.E.
Haywards, Ltd., 187-201, Union-street, S.E.1.
Jennings, C., and Co., 962, Pennywell-road, Bristol.

Glass (Reflectors and Light-Increasing)—
Clark, James, & Son, Ltd., 1-7, Scoresby-st., Blackfriars-rd., S.E.

Glass (Silverers and Makers of Framed Mirrors)—
Clark, James, & Son, Ltd., 1-7, Scoresby-st., Blackfriars-rd., S.E.

Glass (Stained)—
Haywards, Ltd., 187-201, Union-street, S.E.1.
Heaton, Butler, and Bayne, Garrick-street, W.C.

Glaziers (Shop Fronts, Sashes, Skylights, and General Buildings)—
Clark, James, & Son, Ltd., 1-7, Scoresby-street, Blackfriars road, S.E.
Braby, F., & Co., Euston-road, N.W.
Grover & Co., Ltd., Carpenters-road, Stratford, E.
Haywards Ltd., 187-201, Union-street, S.E.1.
Paragon Glazing Co., 60, Queen Victoria-street, E.C.

Glue—
Improved Liquid Glues Co., Ltd., Great Hermitage-street, London, E.

Gold and Silver (Old), Buy or Sell—
Miles, R. A., 34, Great Queen Street, Kingsway London, W.C.

Granite—
Easton, J., & Son, Northernhey-street, Exeter.
Freeman, J., Sons, & Co., Ltd., St. Stephen's House, Westminster S.W.

Heating Apparatus—
Gibbs & Co., Ltd., Renton, St. James Work, Mill-street, Liverpool.
Haywards, Ltd., 187-201, Union-street, S.E.1.
Messenger & Co., Ltd., Loughborough.
Rosser & Russell, Ltd., 22, Charing Cross, S.W.

Instruments, Surveying & Drawing—
Clarkson, 338, High Holborn, W.C.

Insurance—
Sun Insurance Co., Ltd., Threadneedle-street, E.C

Joinery—
Bullen Bros. & Sons, Ltd., 242, Upper Parliament Street, Liverpool, S.
Jennings C., & Co., 952, Pennywell-road, Bristol.
Ogilvie & Co., Mildmay Avenue, Islington, N.

Ladders—
Builders' Material Association, 92, Berwick-street, W.

Lathing (Steel Fireproof)—
Builders' Material Association, 92, Berwick Street, W.
Haywards, Ltd., 187-201, Union Street, S.E.1.

Leaded Lights—
Haywards, Ltd., 187-201, Union Street, S.E.1.
Williams, Gamon & Co., Kaleyards Works, Chester.

Letters—
Francis, S. W., & Co., Ltd., 66, Gray's Inn Road, W.C.

Lifts—
Waygood-Otis, Ltd., Falmouth Road, S.E.1.

Lightning Conductors—
Anderson, Richard, & Co., 68, Leadenhall Street, E.C.
Gray, J. W., & Son, 91 Leadenhall Street, E.C.

Lime—
Builders' Material Association, 92, Berwick Street, W.
Kaye & Co., Ltd., Southam Works, Rugby.

Linoleum—
Catesbys, Ltd., Tottenham Court Road W.

Lithography—
Allday, Ltd., Edmund Street, Birmingham.

Locks—
Gibbons, James, Church Lane, Wolverhampton.
Hobbs, Hart, & Co., Ltd., Arlington Street, N.

Mantel Pieces—
Bullen Bros. & Sons, Ltd., 242, Upper Parliament Street, Liverpool, S.

Marble—
Glanville, E. S., 11 and 13, Low Erne Street, Dublin.
Sajan & Co., Elphinstone Circle, Fort, Bombay, India.

Mill Mortar—
Builders' Material Association, 92, Berwick Street, W.

Monuments—
Bradford, E. J. & A. T., 62a, Borough Road, London, S.E.

Paint, Varnish, &c.—
Berger, Lewis, & Sons, Ltd., Homerton, N.E.
Builders' Material Association, 92, Berwick Street, W.
Clark, Robt. Ingham, & Co., Ltd., 6, Caxton House, Westminster, S.W.
Stephens, H. C., Aldersgate Street, E.C.

Parquet Flooring Manufacturers—
Bassant, H., & Co., Linhope Street Works, Dorset Street, London, N.W.
Damman & Co., Ltd., 187, Park Road London, N.W.
Turpin's Company, 25N, Notting Hill Gate, W.

Partitions—
Thompson, Jabez, & Sons, Ltd., Northwich.

Partitions (Wood)—
Bullen Bros. & Sons, Ltd., 242, Upper Parliament Street Liverpool, S.

Pavement Lights—
Haywards, Ltd., 187-201, Union Street, S.

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RECEIVED.—S. G. Co., Ltd.—F. McN. and Co.—A. W. M.—H. A. C.—F. D.—Mancunian—J. G. and Co. —Defendant.

MALUS.—Yes.

M. S. A.—Please send.

H. F. F.—Thanks; but we have said so.

INQUIRER.—We do not know. We remember Brunel contributed a paper to the R.I.B.A. on March 14, 1836, describing his system of constructing brick arches without centreing, as used by him in the shaft of the Thames Tunnel, the principle of which was founded on the cohesive power of Roman cement coupled with hoop-iron ties—a sort of reinforced brickwork, in short.

CADIT QUÆSTIO.—Too long. We quite agree with your opening remarks, but your remedy was urged the other day at the R.I.B.A., and the Member who had been secretary to that Committee for many years said that "Every time the Art Committee wanted to do anything the Council would put it on one side." As he further said:—"The first thing the Institute ought to do is to put its house in order and get to work. It should take up a courageous policy and never mind about making mistakes—it is bound to make mistakes, and this Institute has been afraid of making mistakes in the past, and has consequently done nothing for architecture, although it may have done much for architects."

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[Coated with composition, 5s. 0d. per ton extra. Turned and bored joints, 5s. per ton extra.]

Pig Iron—	Per ton.				Per ton.
Cold Blast, Lilleshall	177s.	6d.	to	182s.	6d.
Hot Blast, ditto	115s.	0d.	,,	125s.	0d.

Wrought-Iron Tubes and Fittings—Discount off Standard Lists f.o.b. (plus 2½ per cent.)—

Gas-Tubes	52½ p.c.
Water-Tubes	47½ ,,
Steam-Tubes	42½ ,,
Galvanised Gas-Tubes	35 ,,
Galvanised Water-Tubes	26½ ,,
Galvanised Steam-Tubes	20 ,,

OTHER METALS.

A licence must be obtained from the Director of Materials (A.M. 2 (E).), Hotel Victoria, Northumberland Avenue, S.W., and should accompany orders for quantities over 1 cwt.

	Per ton.				Per ton.
Lead Water Pipe, Town	*£39	0	0 to		—
,, ,, ,, Country	*40	0	0 ,,		—
Lead Barrel Pipe, Town	*40	0	0 ,,		—
,, ,, ,, Country	*41	0	0 ,,		—
Lead Pipe, tinned inside, Town	*41	0	0 ,,		—
,, ,, ,, Country	*42	0	0 ,,		—
Lead Pipe, tinned inside and outside, Town	*43	10	0 ,,		—
,, ,, ,, Country	*44	10	0 ,,		—
Composition Gas-Pipe, Town	*42	0	0 ,,		—
,, ,, Country	*43	0	0 ,,		—
Lead Soil-pipe (up to 4½in.) Town	*42	0	0 ,,		—
,, ,, ,, Country	*43	0	0 ,,		—
[Over 4½in. £1 per ton extra.]					
Lead, Common Brands	26	0	0 ,,		—
Lead, 4lb. sheet, English	38	10	0 ,,		—
Lead Shot, in 28lb. bags	—		,,		—
Copper Sheets, Sheathing & Rods	168	0	0 ,,	170	0 0
Copper, British Cake and Ingot	147	0	0 ,,	150	0 0
Tin, English Ingots	285	0	0 ,,		—
Do., Bars	186	10	0 ,,	187	10 0
Pig Lead, in 1cwt. Pigs, Town	33	12	6 ,,	34	12 0
Sheet Lead, Town	*38	10	0 ,,		—
,, ,, Country	*39	10	0 ,,		—
Genuine White Lead	*53	10	0 ,,		—
Refined Red Lead	42	0	0 ,,		—
Sheet Zinc	129	0	0 ,,		—
Spelter	93	0	0 ,,	110	0 0
Old Lead, against account	26	0	0 ,,		—
Tin, per cwt.	11	15	0 ,,		—
Cut nails (per cwt. basis, ordinary brand)	1	7	0 ,,		—

* For 5 cwt. lots and upwards.

SLATES.

	in.	in.	£	s.	d.	per 1,000 of
Blue Portmadoc	20 × 10	..	11	17	6	1,200 at r. stn.
,, ,,	16 ,, 8	..	6	0	0	,, ,,
First quality	16 ,, 10	..	11	15	0	,, ,,
Blue Bangor	20 ,, 10	..	12	0	0	,, ,,
,, ,,	20 ,, 12	..	12	2	6	,, ,,
First quality	20 ,, 10	..	11	15	0	,, ,,
Firs quality	20 ,, 12	..	11	0	0	
,, ,,	16 ,, 8	..	6	0	0	,, ,,
ureka unfading green	20 ,, 10	..	15	17	6	,, ,,
,, ,,	20 ,, 12	..	18	7	6	,, ,,
,, ,,	18 ,, 10	..	13	5	0	,, ,,
,, ,,	16 ,, 8	..	10	5	0	,, ,,
Permanent Green	20 ,, 10	..	11	12	6	,, ,,
	18 ,, 10	..	9	12	6	,, ,,
	16 ,, 8	.	6	12	6	,, ,,

BRICKS.

(All prices net.)

First Hard Stocks	£2	2	0	per 1,000 alongside, in	
Second Hard Stocks	1	16	0	,, ,,	[river.
Mild Stocks	1	14	0	,, ,,	
Picked Stocks for Facings	2	14	0	,, delivered at rally. station.	
Flettons	1	13	0	,, ,,	,,
Pressed Wire Cuts	1	18	0	,, ,,	,,
Red Wire Cuts	1	14	0	,, ,,	,,
Best Fareham Red	3	12	0	,, ,,	
Best Red Pressed Ruabon Facing	5	5	0	,, ,,	,,
Best Blue Pressed Staffordshire	5	7	0	,, ,,	,,
Ditto Bullnose	5	12	0	,, ,,	,,
Best Stourbridge Fire-bricks	7	0	0	,, ,,	,,
2½in. Best Red Accrington Plastic Facing Bricks	4	10	6	,, Net, delivered in full truck loads London.	

Per 1,000

3½" Accrington Best Red Plastic Facing Bricks	£2 10 0
3½" ditto Second Best Plastic ditto	2 2 6
Ditto Ordinary Secondary Bricks	1 11 3
Ditto Plastic Engineering Bricks	1 17 6
Sewer Arch Brick, not more than 3½ in thickest part	£2 0 0
3½" Chimney Bricks fit for outside work	2 6 0
3½" ditto ditto through and through	2 0 0
3½" Beaded, Ovolo and Bevel Jambs; Octagons; 2½" and ½" radius Bullnoses; Stock patterns	3 7 6
Accrington Air Bricks, 9" × 2 course deep, each	0 0 6
Ditto ditto 9" × 1 course	0 0 3

Accrington Camber Arches:—

3 course deep 4½" soffit, per foot opening	0	1	3
4 ,, 4½" ,, ,, ,,	0	1	8
5 ,, 4½" ,, ,, ,,	0	2	1
6 ,, 4½" ,, ,, ,,	0	2	6
3 ,, 9" ,, ,, ,,	0	2	1
4 ,, 9" ,, ,, ,,	0	2	11
5 ,, 9" ,, ,, ,,	0	3	6
6 ,, 9" ,, ,, ,,	0	4	6

Net free on rail, or free on boat at works.

GLAZED BRICKS.

HARD GLAZES (PER 1,000).

	White, Ivory, and Salt Glazed. Best.	Best. Seconds.	Buff, Cream, & Bronze.	Other Colours.	Seconds Colours.
Stretchers—	£14 17 6	£13 17 6	£16 7 6	£20 7 6	£15 7 6
Headers—	14 7 6	13 7 6	15 17 6	19 17 6	14 17 6
Quoins, Bullnose, and 4½in. Flats—	18 7 6	17 7 6	20 7 6	23 17 6	18 17 6
Double Stretchers—	20 7 6	19 7 6	23 7 6	26 17 6	20 17 6
Double Headers—	17 7 6	16 7 6	20 7 6	23 17 6	17 17 6
One side and two ends, square—	21 7 6	20 7 6	24 7 6	28 17 6	21 17 6
Two sides and one end, square—	22 7 6	21 7 6	25 7 6	29 7 6	22 17 6
Splays and Squints—	19 17 6	18 17 6	24 7 6	27 7 6	20 7 6
Stretchers cut for Closers—	15 17 6	14 17 6	17 7 6	21 7 6	16 7 6
Nicked Double Headers—	18 7 6	17 7 6	21 7 6	24 17 6	18 17 6

Compass Bricks, Circular and Arch Bricks, not exceeding 9 × 4½ × 2½ in., of single radius, £6 per 1,000 over and above list for their respective kinds and colours.

The following prices of Special Bricks are plus 25 %:—

Plinth and Hollow Bricks, Stretchers and Headers—
5d. each 4d. each 6d. each 6d. each 5d. each

Double Bullnose, Round Ends, Bullnose Stops—
5½ each 4d. each 6d. each 6d. each 5d. each

Rounded Internal Angles—
4d. each 3d. each 5d. each 5d. each 4d. each

Camber Arch Bricks, not exceeding 9 × 4½ × 2½ in., any kind or colour, 1s. 2d. each.

MOULDED BRICKS.

Stretchers and Headers—
8d. each 8d. each 8d. each 8d. each 8d. each

Internal and External Angles—
1/2 each 1/2 each 1/2 each 1/2 each 1/2 each

Sill Bullnose, Stretchers, and Headers—
5d. each 4d. each 6d. each 6d. each 5d. each

	Per 1,000
Majolica or Soft Glazed Stretchers and Headers	£25 7 6
,, ,, Quoins and Bullnose	30 7 6

These prices are carriage paid in full truck loads to London Stations.

SAND AND BALLAST.

	s.	d.	
Thames Sand	8	3	per yard, delivered.
,, Ballast	8	3	,, ,,
Pit Sand	9	6	,, ,,
Best Washed Sand	10	0	,, ,,

CEMENT AND LIME.

	s.	d.	s.	d.	Per ton,
Best Portland Cement	45	0	to 48	0	delivered.
Ground Blue Lias Lime	25	6	per ton, delivered.		

Exclusive of charge for sacks.

	s.	d.	s.	d.	Per yard.
Grey Stone Lime	18	0	to 18	6	delivered,

Stourbridge Fireclay in sacks 35s. 0d. per ton at railway station.

STONE.*

	£	s.	d.
Yellow Magnesian, in blocks .. per foot cube	0	3	3
Red Mansfield, ditto ,,	0	2	9
White Mansfield, ditto ,,	0	2	9
Red Corsehill, ditto ,,	0	2	6
Darley Dale, ditto ,,	0	2	5
Greenshill, ditto ,,	0	2	4
Closeburn Red Freestone, ditto ,,	0	2	2
Ancaster, ditto .. .. ,,	0	2	0
Beer Stone, delivered on rail at Seaton Station ,,	0	1	1
Ditto, delivered at Nine Elms Station ,,	0	1	7½
Chilmark, ditto (in truck at Nine Elms) ,,	0	1	10½
Hard York, ditto ,,	0	2	0
Do. do. 6 in. sawn both sides, landings, random sizes ... per foot sup.	0	2	5
Hard York, 3 in. slab sawn two sides, random sizes ... per foot cube	0	1	0
Bath Stone—Delivered in railway trucks at Westbourne Park, Paddington (G.W.R.), or South Lambeth (G.W.R.) per cube foot	0	1	7
Delivered in railway trucks at Nine Elms (L. & S.W.R.) .. ,,	0	1	8½
Delivered on road waggons at Nine Elms Depot ,,	0	1	9½
Portland Stone—Brown Whitbed in random blocks of 20 ft. average, delivered in railway trucks at Westbourne Park (G.W.R.), South Lambeth (G.W.R.), or Nine Elms (L. & S.W.R.) ,,	0	2	5½
Delivered on road waggons at Pimlico Wharf or Nine Elms Depot ,,	0	2	6½

White Basebed—2d. per foot cube extra.

* All F.O.R. London.

TILES.

	s.	d.	Discount.
Plain red roofing tiles	42	6 per 1,000	5 per cent.
Hip and Valley tiles	5	6 per doz.	,,
Broseley tiles	52	6 per 1,000	,,
Ornamental tiles	55	0 ,,	,,
Hip and Valley tiles	5	6 per doz.	,,
Ruabon Red, brown, or brindled ditto (Edwards)	57	6 per 1,000	,,
Ornamental ditto	60	0 ,,	,,
Hip tiles	4	0 per doz.	,,
Valley tiles	3	0 ,,	,,
Selected "Perfecta" roofing tiles: Plain tiles (Peake's)	46	0 per 1,000	,,
Ornamental ditto	48	6 ,,	,,
Hip tiles	3	10½ per doz.	,,
Valley tiles	3	4½ ,,	,,
"Rosemary" brand plain tiles	48	0 per 1,000	,,
Ornamental tiles	50	0 ,,	,,
Hip tiles	4	0 per doz.	,,
Valley tiles	3	8 ,,	,,
Staffordshire (Hanley) Reds or brindled tiles	42	6 per 1,000	,,
Hand-made sand-faced	45	0 ,,	,,
Hip tiles	5	6 per doz.	,,
Valley tiles	5	6 ,,	,,
"Hartshill" brand plain tiles, sand-faced	45	0 per 1,000	,,
Pressed	42	6 ,,	,,
Ornamental ditto	47	6 ,,	,,
Hip tiles	4	0 per doz.	,,
Valley tiles	3	6 ,,	,,

OILS.

Rapeseed, English pale, per tun	£28	15	0 to	£29	5 0
Ditto, brown ,,	26	15	0 ,,	27	5 0
Cottonseed, refined ,,	29	0	0 ,,	30	0 0
Olive, Spanish ,,	39	10	0 ,,	40	0 0
Seal, pale ,,	21	0	0 ,,	21	10 0
Coconut, Cochin ,,	46	0	0 ,,	46	10 0
Ditto, Ceylon ,,	42	10	0 ,,	43	0 0
Ditto, Mauritius ,,	42	10	0 ,,	43	0 0
Palm, Lagos ,,	32	5	0 ,,	33	5 0
Ditto, Nut Kernel ,,	35	0	0 ,,	35	10 0
Oleine ,,	17	5	0 ,,	19	5 0
Sperm ,,	30	0	0 ,,	31	0 0
Linseed Oil per gal.	0	5	4 ,,		—
Baltic Oil ,,		—	,,		—
Turpentine ,,	0	4	8 ,,		—
Putty (Genuine Linseed Oil) per cwt.	0	15	7 ,,		—

GLASS (IN CRATES).

	15 oz.	21 oz.	26 oz.	32 oz.
English Sheet Glass				
Fourths	5d. ..	6d. ..	7d. ..	8½d.
Thirds	5½d. ..	6½d. ..	7½d. ..	9½d.
Fluted Sheets	6½d. ..	7½d. ..	— ..	—

	⅛ in.	¼ in.	½ in.
Hartley's English Rolled Plate	4d. ..	4½d. ..	4½d.

	White.	Tinted.
Figured Rolled	6d. ..	7d.
Renoussine	5½d. ..	6½d.
Rolled Sheet	5d. ..	—
Stippolyte	6d. ..	—

Mr. Edmund Harrington, estate manager to the Public Trustee, has been made a Freeman of the City of London.

The Gourock Town Council have decided to proceed with the second contract in connection with the Daff water scheme and to carry through the work on their own behalf. This contract consists of the piping from the Roman Bridge, near Inverkip, to their present system, and the cost is estimated at £11,000.

Property owners may note and benefit by the action taken by St. Bartholomew's Hospital in connection with its London estate. In view of the enhanced cost of building—estimated at anything up to 33 per cent. and of the conditions that rule generally, all the fire insurances have been increased by 25 per cent.

In reply to a question in the House of Commons as to whether the Sub-Committee on Housing (Reconstruction After the War) had yet reported; and, if not, when a report might be expected, Mr. Bonar Law said there was no Sub-Committee dealing with the subject. It was, however, being investigated by the Local Government Board with the co-operation of the Reconstruction Committee, and although he could not say when it would be possible to make a statement, he assured the House that it was a subject of the urgency of which the Government was fully alive.

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REPLIES TO ADVERTISEMENTS.

The Publisher strongly advises all advertisers to have their replies sent to their own addresses, and thus prevent delay and miscarriage. Advertisers, however, may, if they so desire, have their letters addressed to them at the office of the BUILDING NEWS. If replies are called for by the advertiser, no charge is made. If replies have to be forwarded, a charge of 6d. is made over and above the cost of the advertisement. If the advt. is paid for at the advertisement desk, the advertisement Clerk will insert a NUMBER in the advt., to which replies will be addressed, corresponding with that on the advertisement receipt, and only on production of which will replies be given up. If advts. are sent by post, some distinctive name or initials must be used, AND NOT A NUMBER. The publisher especially appeals to such advertisers not to use initials. It is impossible to guarantee the delivery of the right replies to half-a-dozen "A.B.'s" or "X.Y.Z.'s," or "Alpha's," whose advertisements may be in the same number. The Publisher strongly advises that COPIES only of testimonials, &c., should be sent in all instances, and in no case will drawings be taken in at the office in reply to advertisements, but returned at once by the postman.

***** ADVERTISEMENTS MUST reach the Office at the latest by 3 p.m. on Tuesday.**

SITUATIONS VACANT.

The Charge for Advertisements for "Situations Vacant" is Two Shillings and Sixpence for Twenty-four Words, and Sixpence for every Eight Words after, WHICH MUST BE PREPAID. All abbreviations and initials are reckoned as words, and the address is charged for.

CARPENTERS.—Large number of first-class Hands, immediately; full district rate, plus bonus; also overtime.—The AUSTIN MOTOR CO., LTD., North Works, Longbridge, Northfield, Birmingham.

CIVIL ENGINEERING DRAUGHTSMAN (Junior) Wanted. Some knowledge of ferro concrete and steel work desirable. Must be ineligible for military service.—Write, stating age, full particulars, and salary required, to SUPERINTENDING CIVIL ENGINEER, H.M. Naval Depot, Dover.

DRAUGHTSMAN, SURVEYOR, LEVELLER, and SANITARY EXPERT. C3 or man over 41.—State salary, experience, and references, Box N 70 LEE and NIGHTINGALE, Liverpool.

FIRMS desirous of promptly DISPOSING STOCKS of TIMBER, in imported specifications, in any part of the country, are invited to communicate in confidence with "IMPORTERS," c.o. J. W. VICKERS and CO., LTD., 5, Nicholas Lane, E.C.

JUNIOR ASSISTANT, neat Tracer, under 16, in Architect's and Surveyor's Office, West End.—Apply by letter, enclosing small tracing, stating age, experience, and salary required, to A. B. C., Box 4,665, WILLINGS, 125, Strand, W.C.2.

LABOURERS Wanted for the Construction of Newport Light Railway; wages, 8½d. per hour, usual overtime rates.—Apply, personally, to the FOREMAN, Permanent Way Depot, East Power Station, Corporation Road, at 9 a.m. or 5.30 daily; or in writing to A. NICHOLS MOORE, Borough Electrical and Tramways Engineer, Town Hall, Newport, Monmouthshire.

MONUMENTAL.—MASONS and LETTER CUTTERS Wanted; also competent MARBLE FIXER, for good job. Good wages and permanent employment for suitable man. Also MARBLE POLISHERS. Good wages and permanent employment for suitable men.—42, PRATT'S, 57, Market Street, Manchester.

PAINTER and PAPERHANGER Wanted.—Apply B. HURST, Littleborough.

PAINTER Wanted.—Apply at 130, Long Lane, Borough, S.E.

PAINTERS and PAPERHANGERS.—Wanted, at once, several first-class Men for hospital and Government controlled work.—Apply, GEORGE HADLEY and SON, 195, Hagley Road, Birmingham.

PAINTERS Wanted; also an APPRENTICE.—BROOK and WHITWORTH, Milkstone Road, Rochdale.

PAPERHANGERS and BRUSH HANDS; also BOY.—141, Upper Warwick Street, Prince's Road.

SHEET METAL WORKER.—FOREMAN Wanted; must be skilled man and good timekeeper.—Apply, JAMES HOWORTH and CO., LTD., Victoria Works, Farnworth.

SHEET METAL WORKERS (good); also good SOLDERERS; Government work; no man on Government work or living over ten miles away need apply.—Apply, NUTTER and SONS, Bridge Works, Dalston.

THE CHESHAM URBAN DISTRICT COUNCIL require the services of a TEMPORARY ASSISTANT in the Surveyor's Office. Applicants must be good draughtsmen, capable of levelling and surveying, and ineligible for military service.—Applications, stating experience, age, and salary required, to be sent on or before Monday, July 2, 1917, to PERCY C. DORMER, Engineer and Surveyor, Council Offices, Chesham, Bucks.

WANTED, PLASTERER, CARPENTER, PAINTER, and good BUILDER'S LABOURERS.—Apply, C. A. HAYES and SON, Thomas Street, Erdington.

SITUATIONS WANTED.

The Charge for Advertisements for "Situations Wanted" is One Shilling for Twenty-four Words, and Sixpence for every Eight Words after, WHICH MUST BE PREPAID. All abbreviations and initials are reckoned as words, and the address is charged for.

ABLE DRAUGHTSMAN, DESIGNER, and COLOURIST DISENGAGED.—Expert constructionist and detailist. Competent quantity surveyor. Town or country.—LEVERETT, 182, Westmoreland Road, Walworth, London, S.E.

A HIGH-CLASS DRAUGHTSMAN, DESIGNER, and DETAILIST disengaged. Town or country. Moderate terms.—ARCHITECT, 24, Harrington Square, London, N.W.1.

AN ARCHITECT (qualified R.I.B.A.) desires engagement; thoroughly good all round, planning, designing, and detailing. Experienced in estate surveying, etc. Also with exceptional experience in shop-fitting, fitments, and high-class decoration. Perspective sketches.—"IONIC," 35, Brunswick Street, C.-on-M., Manchester.

ARCHITECT (Exceptional Designer) RENDERS EXPERT ASSISTANCE. Part time. 20 years' London experience, L.R.I.B.A.Cts.,etc. Moderate crgs.—GERRARD, 191, Aiblon Road, London, N. 16.

CARPENTER (elderly), experienced at bench, house and office furniture, repairs.—CARPENTER, 23, Phelp Street, Walworth, S.E.

CONTRACTOR'S AGENT ENGINEER, A.M.I.M.E., M.I.I.E., age 41, seeks appointment; 22 years' experience in constructional engineering, railways, tramways, general building and ferro-concrete work; used to large contracts; good organiser.—BONNYBRIDGE, BUILDING NEWS Office, Arundel Street, W.C.

FRENCH POLISHING.—CONTRACTS Wanted for any quantity of work. Estimates given.—F. R. SHEATH, Contract Polisher to the Trade, 54, Spenser Road, S.E.24.

HANDYMAN wants job, BRICKLAYING, DRAINS, etc.; East End district. 11d. per hour.—170, West Grove, Woodford.

JOINER, 46, seeks good job at bench; reliable workman; references if required.—H. HARVEY, Churchgate Street, Harlow, Essex.

PAINTING and DECORATING.—Dilapidations or new buildings. Tools and labour, or as Working Foreman.—W. H. WARD, 9, Charleston Street, Walworth, S.E.

READ LATEST LETTER FROM AN ADVERTISER!

135, STONEFIELD TERRACE, HASTINGS.
June 20, 1917.

Please insert advertisement for one insertion. Should your charges have been increased I will forward the difference if you let me know. I have at times for nearly 30 years advertised in your paper and have always had good results.

C. G. FOWLER.

The charge for people wanting situations is still the same—24 words for One Shilling—and it pays the Advertiser.

PLUMBING, CARPENTRY, all jobbing, hotel or estate.—VINCER, 5, Tidbury Street, S. Lambeth.

PLUMBER, FITTER, PAINTER wants job, Public Institution, Schools, or Estate, or as CARETAKER.—F., 135, Stonefield Terrace, Hastings.

SHOP FOREMAN of JOINERS (working) wants re-engagement. Thoroughly understands management and working of machinery, preparing working drawings, details, etc.; references. Age 46.—A. B., 4, Landcroft Road, East Dulwich, S.E.22.

SURVEYOR, age 50, seeks appointment; experience in sewerage, waterworks, bridge, road construction, etc.; held appointments as clerk of works (direct labour and contract).—HODDER, BUILDING NEWS Office, Arundel Street, W.C.

TIMEKEEPER or SUB-CASHIER seeks re-engagement; 20 years' experience on public works and Government work; honest and reliable; good references; abstainer.—H. GILBEY, 53, Harwood Road, Fulham, London, S.W.

TYPEWRITING
TRACINGS and TRANSLATIONS
every description executed with accuracy and despatch.
SPECIFICATIONS AND BILLS OF QUANTITIES
AUTHORS' MS., etc., etc.
Miss MAUDE GATLIFF, 37, ESSEX STREET
Telephone: CENTRAL 4353. STRAND, W.C.

WANTED.

WANTED, large quantity JOISTS, 18 in. by 7 in., or near section, in long lengths.—BARNES and BELL, 79, St. George's Place, Glasgow.

JOINERY, well made, by experienced Joiners, from sound, dry timber; best quality, all new Panel Doors, various sizes and thicknesses. Wood Mantles, various designs. Sashes and Frames, Dressers, Cupboards, Kitchen Tables, etc.; also first-class Garden Furniture, Teak and Deal.—WOODWORKER, BUILDING NEWS Office, 1, Arundel Street, W.C.2.

SALES BY AUCTION.

DONCASTER.—By order of Messrs. LOGAN and HEMINGWAY.—On account of Completion of Contract.—Messrs.

FULLER, HORSEY, SONS, and CASSELL will SELL by AUCTION, at the DEPOTS, DONCASTER, on TUESDAY and WEDNESDAY, JULY 10 and 11, 1917, at Eleven o'clock precisely each day,

CONTRACTORS' PLANT,

including fifty 8 to 10-ton ballast trucks, thirty 4-yard end tip wagons, four saloon and passenger carriages, Ruston-Proctor steam navvy 5-ton derrick crane, hand crane and steam pile engine, pile monkeys, two Ruston-Proctor 14H.P. portable engines, Ingersoll steam-driven air compressor, loco. type boiler, rock drills, Blake Marsden "Acme" stone crusher, saw bench, drilling machine, crabs, steam boilers, pumps, 6,000 feet 2 in. to 4 in. wrought piping, Wakefield flare lights, rails, chairs, sleepers, and railway material, rail presses, steel girder bridge, 58ft. by 16ft.; steel bridge, 36ft. and 42ft. long; skips, wood and iron tanks tramway wagons and bogies, jacks, belts and nuts, and wagon ironwork, engineers' offices and other temporary buildings, large quantity timber, contractors' tools and stores, spare parts, and numerous other effects.

Catalogues, when ready, may be had of Messrs. LOGAN and HEMINGWAY, 16, South Parade, Doncaster, and of Messrs. FULLER, HORSEY and CO., Mechanical Auctioneers and Valuers, 11, Billiter Square, E.C.3.

CONTRACTS.

CROWN LANDS, LONDON.
PICCADILLY CIRCUS BUILDING SITE.

THE Commissioner of H.M. Woods, Forests, and Land Revenues will be prepared to receive, not later than JUNE 30, 1917, TENDERS for a BUILDING LEASE for a term of 80 years of the LAND at the SOUTH-EAST CORNER OF PICCADILLY CIRCUS (adjoining the Criterion Theatre and Restaurant), comprising the sites of Nos 24, 26, 28, 30, 32, 34, and 36, Regent Street, S.W.1, containing an area of about 6,950 square feet, having road frontages of about 73 feet to Piccadilly Circus, 112 feet to Regent Street, and 52 feet to Jermyn Street, and suitable for the erection thereon (after the war) of shops, showrooms, and offices, or similar buildings.

Detailed particulars, plan, conditions, and forms of tender have now been prepared and can be obtained from Mr. JOHN MURRAY, F.R.I.B.A., 11, Suffolk Street, Pall Mall, S.W.1, or from the Office of H.M. Woods, etc., 1, Whitehall, S.W.1.

TO BUILDERS.

The Commissioners of H.M. Works and Public Buildings are prepared to receive Tenders for the ERECTION of 100 HOUSES at Kilbowie, Clydebank.

Tenders are required for the whole work, and not for separate trades.

Drawings, Specification, and a copy of the Conditions and Form of Contract may be seen at H.M. Office of Works, 3, Parliament Square, Edinburgh, or at the office of the Burgh Surveyor, Clydebank, and Bills of Quantities and Forms of Tender obtained from the Principal Architect, H.M. Office of Works, 3, Parliament Square, Edinburgh, on payment of One Guinea. The sum so paid will be returned to those persons who send in tenders in conformity with the conditions specified below.

The Commissioners do not bind themselves to accept the lowest or any Tender.

Tenders must be delivered not later than Tuesday, 10th July, 1917, addressed to the SECRETARY, H.M. Office of Works, etc., Storey's Gate, London, S.W.1., and endorsed "Tender for Clydebank Housing Scheme."

H.M. Office of Works, etc., 21st June, 1917.

FOR SALE.

CLOSE TO THE SEA AND STATION.

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NEW PITCH PINE LOGS.—25 to 34 ft. long by 10in. to 16in. square, 6/6 to 7/6 cub. ft. Also Secondhand Log material (P. Pine, Oregon, etc.), 21t. to 9ft., few longer. 4/- to 5/- cub. ft.

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Equal to new for some purposes (Items 3, 4, 9, & 11, are exceptionally good), nearly free from nails, and most of it free from bolt-holes. Suitable for cheap Casemaking. Approximate details as follows, but other sizes in stock. Portions in Deal, Oregon, Pitchpine. Can be creosoted if required.

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Item 2.—8in. and 9in. by 3in., length 8 to 11ft.; few longer (only few pieces).

Item 3.—9in. by 2in. mixed lengths, 6 to 14 ft.

Item 4.—9in. by 3in. Nosed one edge, about 6ft. long.

Item 5.—10 and 11in. by 1½in., 10 and 11in. by 2in. Mixed lengths. Not many in stock.

Item 6.—Shedding boards 11in. thick, 4 to 12 ins. wide. Some 1½in. and 1¼in.

Item 7.—Tongued and Grooved board 1¼in. by 8 to 9¼in. wide. Mixed lengths. Few 6in. by 2in. nom.

Item 8.—About 4ft. long by 6in. by 3in. with small groove in centre, 2in. by 1½in., suit for sleepers, fencing, posts or guttering.

Item 9.—6ft. 7in. and 7ft. 6in. long, 8in. to 9¼in. by 1½in. Some nosed one edge, some square edge. Sound.

Item 10.—Quantity 3in by 2in., various lengths, chiefly 6 to 14 ft.

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8in. ,,	£31 10 0	,,
9in. ,,	£34 10 0	,,
10in. ,,	£36 10 0	,,

ARCHANGEL (or equal) Red (for joinery, also building purposes). About 15 standards, unsorted quality 7 in by 1½ in. £33, 8 by 1½ £40, 9 by 1½, £41 std

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PARCEL ARCHANGEL STRIPS. 4/11 ft. lengths. Price £31 std.

30 Standards ¾ by 3 2 Standards ¼ by 2½
15 ,, ½ by 2 10 ,, 1 by 1

Also some 12 ft. and up, ½ by 3 in.; price £33 std.

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	U/S quality £ s. d.
4in. to 5in. wide	31 10 0
6in.	32 0 0
7in.	32 10 0
8in.	33 0 0
9in.	36 0 0
11in.	38 0 0

WEATHER BOARD, 6in. by 11in to ¾in. Red Rebated and planed, at 27/6 square (nearly all 12ft. and up); Unplaned at 26/6 square, shorter lengths chiefly 21t to 10ft. We can crosscut to lengths ready for use for a small extra cost.

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10in at 5½d. ,,
11in. at 6d. ,,
12in. at 6½d. ,,

PARCEL U/S ARCH.—White (about 30 stds.), long lengths. Seasoning 2 years—

1¼in. by 11in. at .. £42 std.
1¼in. by 10in. at .. £41 ,,
1¼in. by 9in. at .. £38 ,,

TIMBER BARGAIN.

NOTE.—3 by 9 and up is very scarce at present.

Unsorted Spruce very sound, contains some wane, but very few shakes, now lying at Bristol, Porthcawl, Leicester, and Pembroke Dock.

We may be able to charter a small sailing vessel (hold 40/50 standards) to carry a parcel to any port promptly.

				Price per Std. £	s.	d.	Price per Cube. s.	d.
About 10 stds.	4	by	7	35	5	0	4	3½
,, 1 ,,	4	by	8 and up	37	15	0	4	7
,, 5 ,,	4	by	6	34	15	0	4	2½
,, 1 ,,	4	by	5	34	7	6	4	2
,, 20 ,,	3	by	12 and up	38	12	6	4	8½
,, 10 ,,	3	by	11	38	12	6	4	9½
,, 10 ,,	3	by	10	38	12	6	4	8½
,, 20 ,,	3	by	9	37	2	6	4	6
,, 15 ,,	3	by	8	34	7	6	4	2
,, 10 ,,	3	by	7	33	15	0	4	1½
,, 10 ,,	3	by	6	33	2	6	4	0½
,, 18 ,,	3	by	5	32	15	0	3	11½
,, 16 ,,	3	by	4	33	7	6	4	0½
,, 4 ,,	3	by	3	31	12	6	3	10
,, 3 ,,	2½	by	7	35	5	0	4	3
,, 1 ,,	2½	by	6	33	0	0	4	0½
,, ½ ,,	2½	by	5	32	0	0	3	10
,, ½ ,,	2	by	8 and 9	37	2	6	4	6½
,, 1 ,,	2	by	7	35	7	6	4	3½
,, 2 ,,	2	by	6	34	7	6	4	2
,, 4 ,,	2	by	5	33	2	6	4	0½
,, 3 ,,	2	by	4	35	2	6	4	2
,, 3 ,,	2	by	3	33	7	6	4	0½

Carriage paid to some stations on large quantities at above prices.

Also 40 stds. Spruce nearly all square edge, lying at Neyland, Pembrokeshire, S. Wales. Includes some of the aforementioned sizes. Price 40/- per stand. extra to above as it is superior quality. The Parcel includes the following extra sizes, viz. :—

Size Inches	Price per Std. £	s.	d.	Price per cube. £	s.	d.
1 by 3, 4, 5	35	7	6	0	4	3½
1 by 6, 7	37	15	0	0	4	7
2½ by 4, 3	33	0	0	0	4	0

Above prices for selected sizes but mixed lengths fair average of parcel. Selected lengths ex piles about £1 std. extra.

Sawing can generally be arranged on following basis viz. :—Deeping at 3/6 per 100 sq. feet; Ripping 1/3 per 100 lineal feet.

Prices for crosscutting also planing and T. and Grooving on application.

SWEDISH WHITE SHELVING, 5 stds. planed.

11in. by 1in. at £42 std.
10in. by 1in. at £39 ,,
11in. by ¾in. at £43 ,,
11in. by ½in. at £46 ,,

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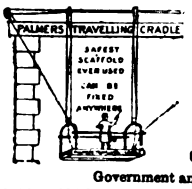

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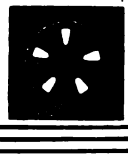
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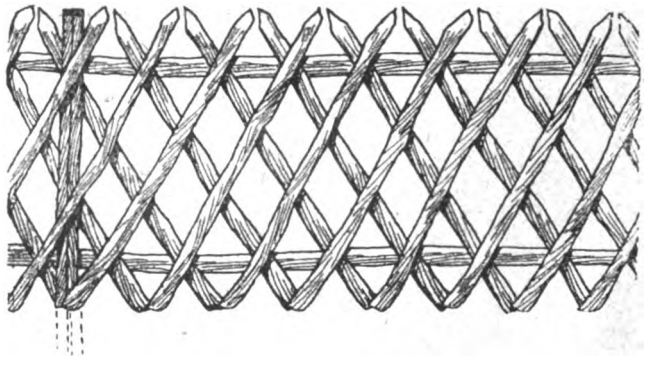
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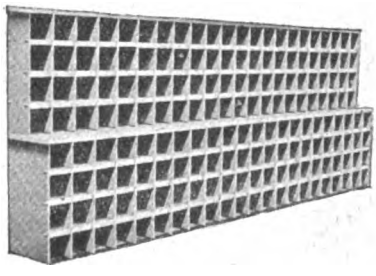
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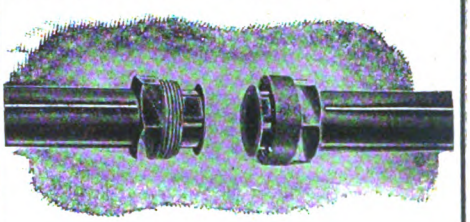
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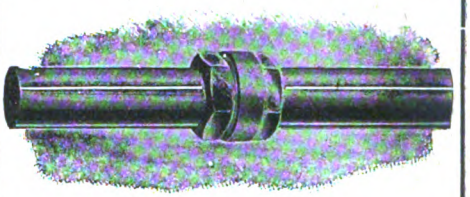
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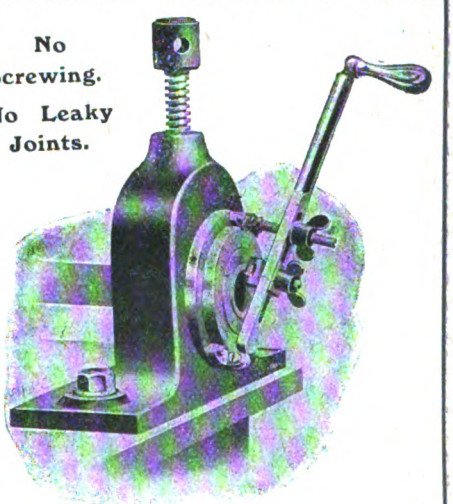
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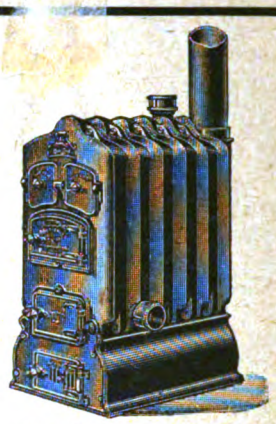

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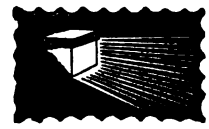

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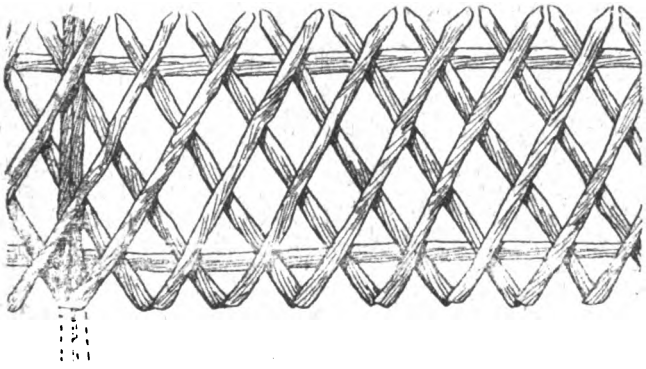

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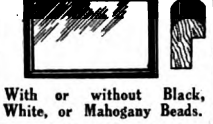

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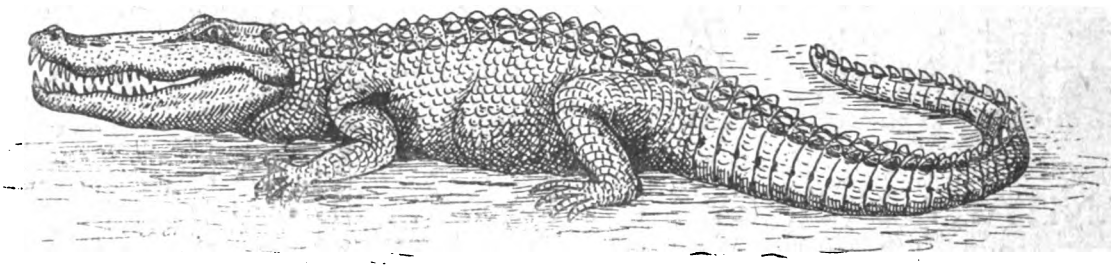

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